L 01241-67

ACC NR: AP6032938

the body surface, the shock wave, the axis of symmetry, and the limiting characteristic. Flows over spherical segments (see Fig. 1) of various semiapex angles 33°

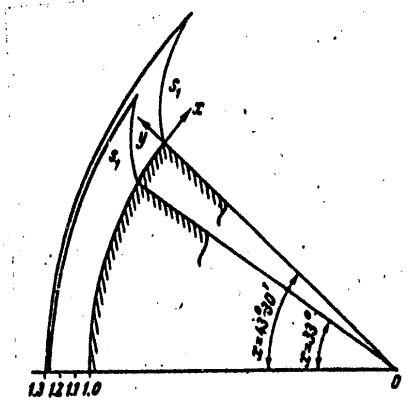
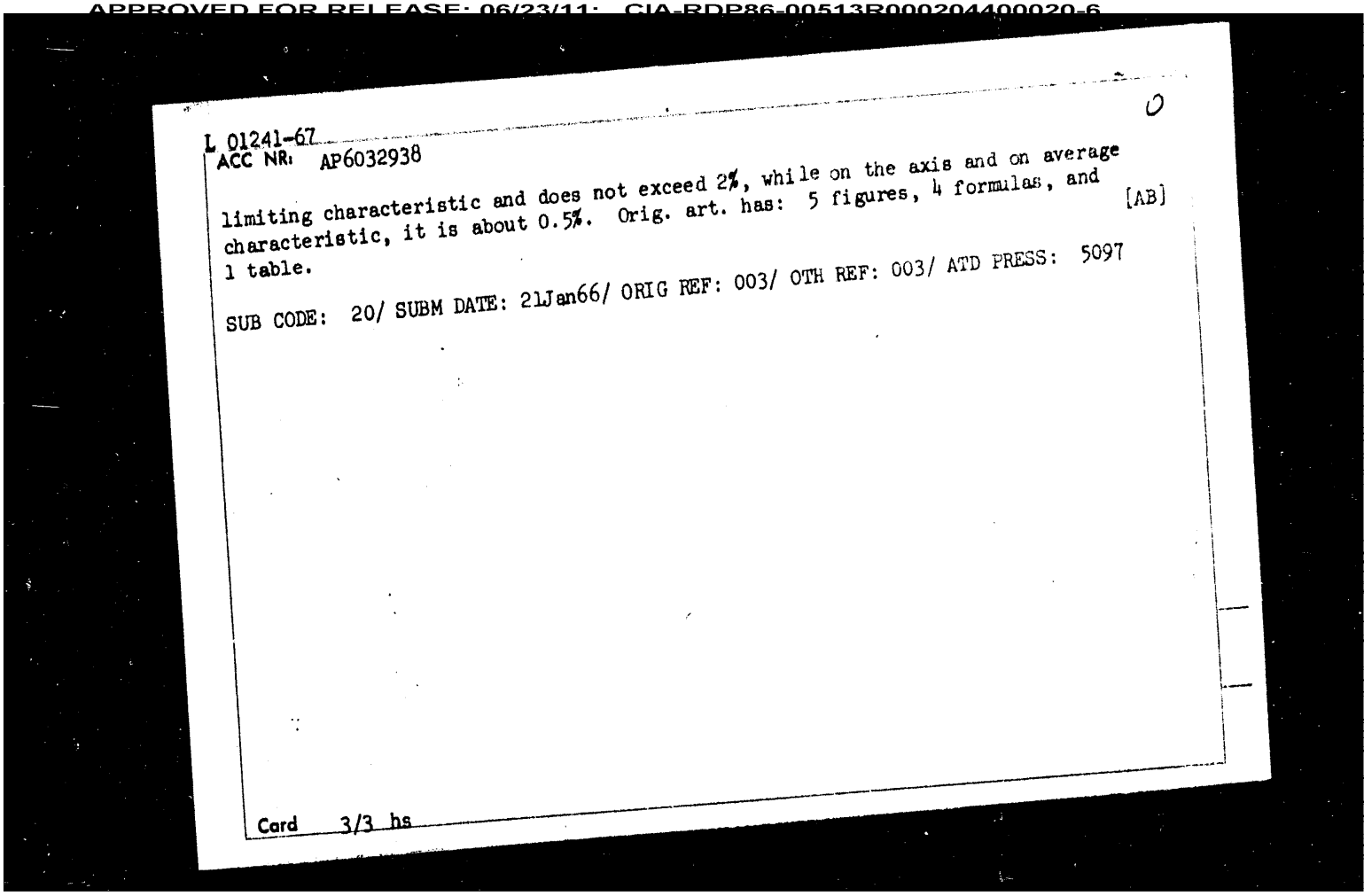


Fig. 1. Schematic diagram of the flow field about spherical segments

and 43°30' at $M_\infty = 10$ were calculated to the second approximation as illustrative examples. Shock wave shapes, velocity distributions on the axis of symmetry, and variation in the stand-off distance of shock waves are given in graphical and tabular form. Analysis of the results shows that the maximum discrepancy takes place in the

Card 2/3



L 01241-67
ACC NR: AP6032938

limiting characteristic and does not exceed 2%, while on the axis and on average characteristic, it is about 0.5%. Orig. art. has: 5 figures, 4 formulas, and 1 table. [AB]

SUB CODE: 20/ SUBM DATE: 21Jan66/ ORIG REF: 003/ OTH REF: 003/ ATD PRESS: 5097

Card 3/3 hs

ACC NR: AP7000780 SOURCE CODE: UR/0208/66/006/006/1064/1081

AUTHOR: Belotserkovskiy, O. M. (Moscow); Bulekbayev, A. (Moscow); Grudnitskiy, V. G. (Moscow)

ORG: none

TITLE: Algorithms for numerical schemes of the method of intergral relations for calculating mixed gas flows

SOURCE: Zhurnal vychislitel'noy matematiki i matematicheskoy fiziki, v. 6, no. 6, 1966, 1064-1081

TOPIC TAGS: supersonic aerodynamics, shock wave, equilibrium dissociation, gas dissociation, gas relaxation, approximation method, mathematic method

ABSTRACT: This article deals with the application of numerical techniques, based on the use of computers, to the solution of the direct problem of supersonic flow past blunt bodies by the method of integral relations. The problem consists of determining the single-valued and continuous solution for the region of minimum effect of bluntness with boundaries formed by the shock wave AB_3, axis of symmetry AE, body contour DE, and boundary characteristic B_3D (see Fig. 1). Three different schemes of the method of integral relations are outlined for which the construction of three algorithms are presented. The first one was constructed according to scheme I for supersonic flows past axisymmetric bodies with equilibrium dissociation

 UDC: 517.9:533.011

ACC NR: AP7000780

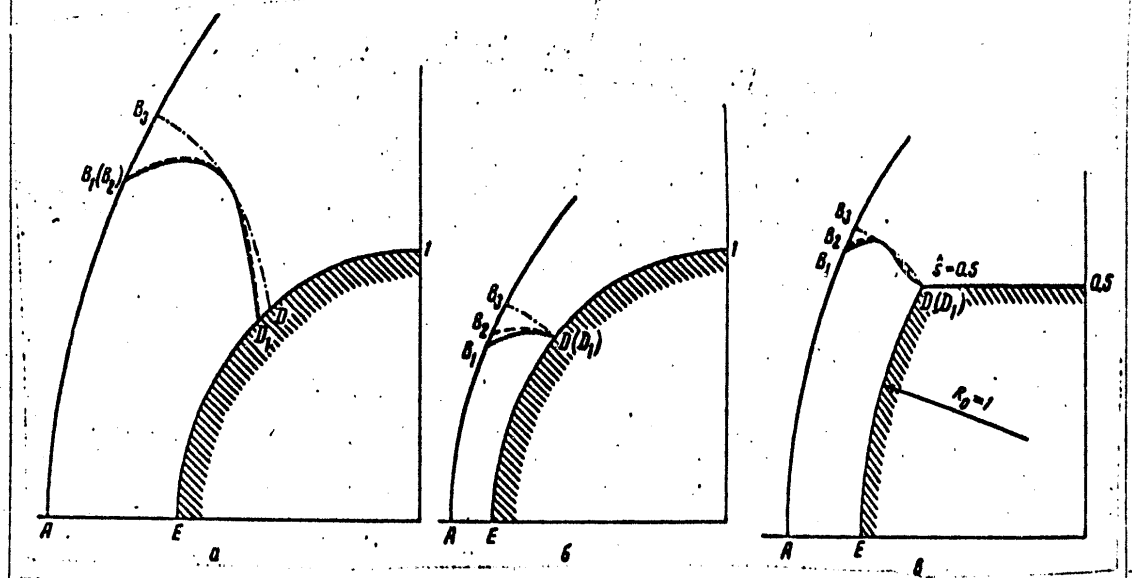


Fig. 1. Flow configuration about: a - circular cylinder, b - sphere; c - sphere with corner point

—— sonic line ($v = c$)B_1D_1; ---- singular line ($v = c$) B_2D_1; .-.-. boundary characteristic B_3D.

Card 2/3

ACC NR: AP7000780

taken into account. The second was construction by considering supersonic real gas flows past blunt bodies, with nonequilibrium dissociation taken into account. The third was constructed by using double approximation according to scheme II, then integrating and approximating according to scheme I. It is said that due to the difficulties in obtaining analytical evaluations of the accuracy and convergence of the method of integral relations, the basic criterion should be numerical evaluation. To this end, calculations in various approximations were carried out according to each of the three schemes for a sphere at M = 10. The results are presented in tabular form. For comparison, the values of gasdynamic parameters of flows calculated by schemes I and II are presented in a table. The comparison shows good agreement, although an approximate representation of the functions was used in opposite directions in each of the schemes. Orig. art. has: 5 figures, 11 formulas, and 5 tables. [AB]

20,09,12

SUB CODE: ~~20~~ SUBM DATE: 21Jan66/ ORIG REF: 005/ ATD PRESS: 5109

Card 3/3

Belotserkovskiy, S.M.

USSR/Engineering - Mechanics FD-1121

Card 1/1 Pub. 41-2/17

Author : Fedyayevskiy, K. K. and Belotserkovskiy, S. M. Moscow

Title : Aerodynamic forces acting on land structures during squalls

Periodical : Izv. AN SSSR. Otd. tekh. nauk 6, 13-24, June 1954

Abstract : Examines problem of inertia and vertical forces acting on land structures during a squall. Gives formulas for calculating these forces. Graphs. Six references.

Institution :

Submitted : July 29, 1953

BELOTSERKOVSKIY, S.M.

USSR/Physics - Aerodynamics of Vortices FD-1651

Card 1/1 Pub. 85-3/16

Author : Belotserkovskiy, S. M. (Moscow)

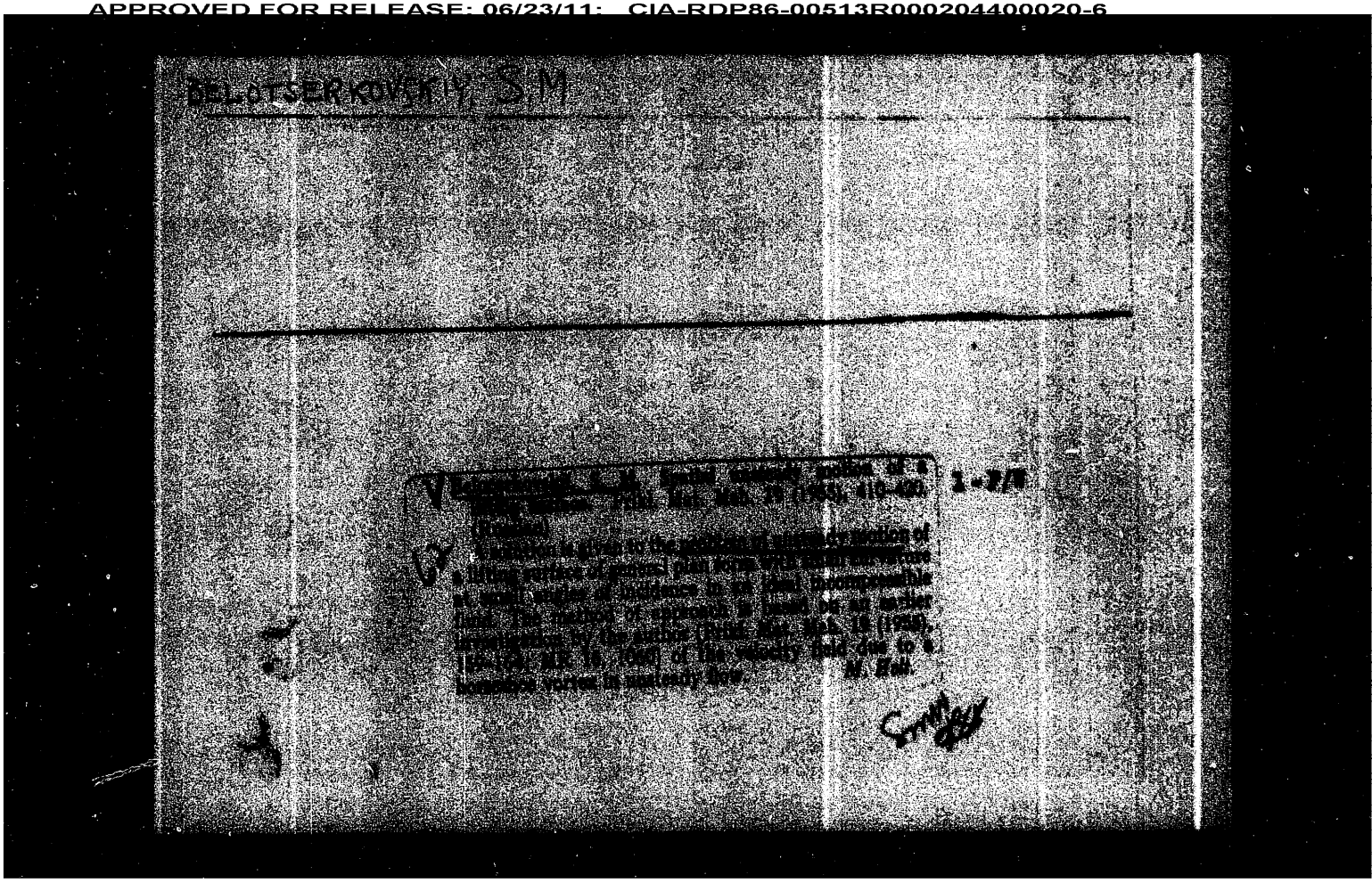
Title : Horseshoe-shaped vortex during unsteady motion

Periodical : Prikl. mat. i mekh., Vol. 19, 159-164, Mar-Apr 1955

Abstract : The author investigates the field of velocities which form in an ideal incompressible fluid from an associated vortex of finite span, whose intensity gamma varies with time, and from the corresponding system of free vortices. It is assumed here that the velocity of washing away of the free vortices is constant in magnitude and direction. For the case of constant gamma he obtains the well known system of horseshoe-shaped vortices. For intensity of the associated vortex that depends upon time, the free vortices fall off from it; the axis are parallel to the axis of the associated. Moreover, the intensity of each of the two free vortical strings parallel to the velocity of washing away is less both along the length of the string and also in time. The results of the author's work permit one to pass over to the solution of the problem of the spatial nonstationary motion of an arbitrary weakly cambered supporting surface. One reference: D. E. Lehrian, "Calculation of the complete downwash in three dimensions due to a rectangular vortex. ARC, Rep. and Mem., No 2771, 1953.

Institution : --

Submitted : November 16, 1954



APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204400020-6

BELOTSERKOVSKIY, S.M. (Moskva)

Representation of non-stationary aerodynamic moments and forces by means of coefficients of rotational derivatives. Izv.AN SSSR Otd. tekh.nauk no.7:53-70 Jl '56. (MLRA 9:9)
(Aerodynamic load)

BELOTSERKOVSKIY, S.M. (Moskva)

Annular vortex in unsteady flow. Prikl.mat. i mekh. 20 no.2:173-183
Mr-Ap '56. (Hydrodynamics) (MLRA 9:7)

BELOTSERKOVSKIY, S. M. (Moscow)

"Theoretical Evaluation of Dynamic Stability Parameters (Coefficients)."

report presented at the First All-Union Congress on Theoretical and Applied Mechanics, Moscow, 27 Jan - 3 Feb. 1960.

S/124/62/000/008/009/020
I006/I242

AUTHORS: Belotserkovskiy, S.M., Ginevskiy, A.S., and Polonskiy, Ya.Ye.

TITLE: Aerodynamic forces acting on a net of profiles in non steady flow

PERIODICAL: Referativnyy zhurnal, Mekhanika, no.8, 1962, 29, abstract 8B176. (In collection: Prom. aerodinamika, no.20, M., Oborongiz, 1961, 137-167)

TEXT: Incompressible nonviscous flow past a net of thin profiles (plates) is considered. The profiles execute oscillations with equal phase, and can be deformed simultaneously. Each profile is replaced by a system of continuously distributed

Card 1/4

Aerodynamic forces acting ...

vortices with a time-dependent intensity. In the customary linear framework of the problem it is assumed that the vortex sheet leaving the profiles maintains an invariable position with respect to the oscillating net. The problem is solved numerically, and for this purpose the continuous vortex sheet along the profile contour is replaced by a discreet number of joined vortices. The determination of the cirulation amplitude is reduced to the solution of a system of linear algebraic equations. The equation coefficients are functions of the net parameters and of the Strouhall number. The coefficients of lift and moment of the profile are determined by the formulae

$$c_y = c_{y\infty} + c_y^{\alpha}\alpha + c_y^{\dot{\alpha}}\dot{\alpha} + c_y^{\omega}\omega + c_y^{\dot{\omega}}\dot{\omega} + c_y^{\Delta}\Delta + c_y^{\dot{\Delta}}\dot{\Delta}$$

$$m_z = m_{z\infty} + m_z^{\alpha}\alpha + m_z^{\dot{\alpha}}\dot{\alpha} + m_z^{\omega}\omega + m_z^{\dot{\omega}}\dot{\omega} + m_z^{\Delta}\Delta + m_z^{\dot{\Delta}}\dot{\Delta},$$

where $c_{y\infty}$ and $m_{z\infty}$ - the coefficient of lift and the moment

S/124/62/000/008/009/030
I006/I242

Aerodynamic forces acting...

corresponding to steady flow past the net, respectively. The other terms contain coefficients of rotation derivatives corresponding to the rate of change of angle of attack, $\dot{\alpha}$, the profile rotation, ω, and its deformation, $\dot{\Delta}$. Special cases of identical pure rotational oscillations and pure translational oscillations without deformation are considered. Formulae are obtained, connecting the amplitudes of the lift and moment coefficients c_y^f and m_z^f and the phase shifts ε_1, and ε_2 with the coefficients of rotation derivatives. The change of the angle of attack, $\Delta\alpha_\infty$, under the influence of a chain of initial vortices in a quasi-steady case of purely translational motion of the profiles is determined. A numerical calculation of aerodynamic characteristics of a net of plates is performed on the electronic digital computer "Strela" according to the formulas obtained, for values of consistency $\gamma = b/t$ (b- chord, t- pitch of the net) of 0.25, 0.5, 1.0, 1.5, 2.0 and Strouhall numbers $q = 0$, 0.5, 1.0, 1.5, 2.0 and

Card 3/4

S/124/62/000/008/009/030
I006/I242

Aerodynamic forces acting...

stagger angle β in the range 0 - 60°. For $\tau = 0$ the resultant curves coincide with curves for a single oscillating plate. It is shown that the coefficients of rotation derivatives of the profile in the net are essentially different from the coefficients of a single profile and at low consistencies they depend strongly upon the Strouhall number. All the coefficients of forces and moment at $\tau > 0.5$ are practically independent of the Strouhall number. The considered coefficients of rotational derivatives are practically independent of the angle of attack: $\alpha = 0 - 10°$. The phase shift of the lift coefficient ε_1 attains values of the order of 20 -50° at Strouhall numbers $q = 1 - 2$ and $\tau > 0.5$, whereas the moment coeficient phase shift ε_2 is small. At $q = 0$, $\varepsilon_1 = \varepsilon_2 = 0$.

[Abstracter's note: Complete translation.]

Card 4/4

BELOTSERKOVSKIY, Sergey Mikhaylovich; GINEVSKIY, Aron Semenovich; POLONSKIY, Yakov Yefimovich; SUVOROVA, I.A., red.; PUKHLIKOVA, N.A., tekhn.red.

[Hydrodynamic theory of cascades; aerodynamic power and moment characteristics of cascades of thin profiles] Gidrodinamicheskaia teoriia reshetok; silovye i momentnye aerodinamicheskie kharakteristiki reshetok tonkikh profilei. Moskva, Gos.nauchno-tekhn. izd-vo Oborongiz, 1962. 124 p. (Promyshlennaia aerodinamika, no.22). (MIRA 15:8)

(Cascades (Fluid dynamics))

BELOTSERKOVSKY, S. M.; SUKHORUKIKH, V. S.; TATARENCHIK, V. S. (Moscow)

"Investigation of three-dimensional gas flows on the basis of quantitative optical methods"

report presented at the 2nd All-Union Congress on Theoretical and Applied Mechanics, Moscow, 29 Jan - 5 Feb 1964.

ACCESSION NR: AP4041414 S/0179/64/000/003/0021/0028

AUTHOR: Belotserkovskiy, S. M.; Skripach, B. K.; Tabachnikov, V. G.

TITLE: Determining rotary resistance derivatives in wind tunnels

SOURCE: AN SSSR. Izv. Mekhanika i mashinostroyeniye, no. 3, 1964, 21-28

TOPIC TAGS: resistance derivatives, rotary derivatives, rotary resistance derivatives, wind tunnel test

ABSTRACT: Some special features of experiments determining the rotary resistance derivatives for steady or damped harmonic oscillation of a model at a constant average stream velocity and small oscillation amplitude are discussed. Rotary resistance derivatives of aerodynamic forces and moments are determined analytically from experimentally established relationships between aerodynamic loads acting on the model and kinematic parameters of the model's motion. The cases of oscillation of a model with a rigid coupling (dynamometric method), when kinematic parameters of model motion do not

Card 1/2

ACCESSION NR: AP4041414

depend on acting forces, and of oscillation with elastic coupling (kinematic method), when these parameters depend on acting forces, are analyzed. Two alternatives of the kinematic method, the method of forced vibrations and the method of free vibrations, are also analyzed. Data of experimental investigations of rotary and translational oscillation of a model of a rectangular wing at subsonic speeds by dynamometric and both kinematic methods are compared in diagrams with results of theoretical analysis obtained by the linear theory, showing a fair agreement among all methods. Orig. art. has: 5 figures and 25 formulas.

ASSOCIATION: none

SUBMITTED: 14Feb64	ATD PRESS: 3056	ENCL: 00
SUB CODE: ME	NO REF SOV: 003	OTHER: 001

Card 2/2

ACCESSION NR: AP4041197 S/0207/64/000/003/0095/0099

AUTHORS: Belotserkovskiy, S. M. (Moscow); Sukhorukikh, V. S. (Moscow); Tatarenchik, V. S. (Moscow)

TITLE: Determination of the density field of a three-dimensional gas dynamical flow by optical methods

SOURCE: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 3, 1964, 95-99

TOPIC TAGS: gas flow, gas dynamics, gas density measurement, interferometer

ABSTRACT: A method is described for determining gas densities in a three-dimensional gas dynamical flow by optical measurements. Figure 1 on the Enclosure is a section perpendicular to the direction of the undisturbed gas flow, taken as the x axis. The disturbed region is contained between the solid (1), whose contour is $r = r(\gamma)$, and the outer boundary (2), whose contour is $R = R(\gamma)$. In supersonic flow the head shock wave is the outer boundary. The z_k axis is in the direction of the incident light (wavelength λ). A particular light ray enters and leaves the disturbed region at the points y_k, z_{k1} and y_k, z_{k2} respectively. The maximum values of y_k for the contours of the solid and the outer boundary are h_k and H_k,

Card 1/4

ACCESSION NR: AP4041197

respectively. The density in the section x = const as a function of the polar angle γ and the dimensionless radial coordinate

$$\xi = \frac{r-t}{R-t}$$

are represented in the form

$$\rho(\xi, \gamma) = \sum_{m=0}^{q_\rho - 1} \rho_m(\xi) \cos^m \gamma$$

where q is related to the number of independent values of φ_k ($0 < \varphi_k < \pi$) used in making the optical measurements. The density can be found from the system of integral equations

$$\sum_{m=0}^{q_\rho - 1} \int_{z_{k1}}^{z_{k2}} \rho_m(\xi) \cos^m \gamma \, dz_k = z_{k2} - z_{k1} + \varepsilon_k m_k(\zeta)$$

$$\zeta = \frac{y_k - h_k}{H_k - h_k} \qquad (k = 1, 2, \ldots, q)$$

$$\varepsilon_k = \frac{\rho_0 \lambda}{P_{00}(n_0 - 1)}$$

ACCESSION NR: AP4041197

where ρ_0 and n_0 are the density and index of refraction of the gas at standard conditions and ρ_∞ is the density in the undisturbed current. The function $m_k(y_k)$ determined by interference measurements expresses the change of the optical path length of light passing through the disturbed region along the chord y_k = const. The procedure is illustrated with gas flow (Mach 3.5 and 4.2) about a 30° cone whose axis is inclined 7½° away from the direction of the undisturbed flow. Photographs made using an interferometer are shown from which the functions m_k were determined. Graphs of the gas density as a function of γ and ξ are presented. Orig. art. has: 23 equations and 8 diagrams.

ASSOCIATION: none

SUBMITTED: 29Feb64 ENCL: 01

SUB CODE: ME NO REF SOV: 002 OTHER: 001

3/4

Card

ACCESSION NR: AP4041197

ENCLOSURE: 01

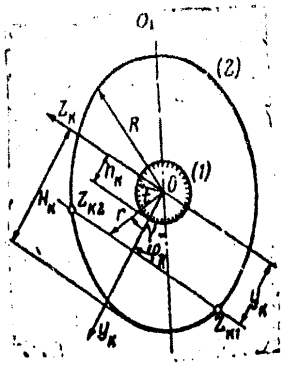


Fig. 1. Coordinates used in determining gas density by optical methods.

Card 4/4

ACCESSION NR: AP4043903 S/0179/64/000/004/0157/0160

AUTHOR: Belotserkovskiy, S. M., Kudryavtseva, N. A., Tabachnikov, V. G.

TITLE: Experimental verification of some premises of the non-stationary theory for finite span airfoils

SOURCE: AN SSSR. Izvestiya. Mekhanika i mashinostroyeniye, no. 4, 1964, 157-160

TOPIC TAGS: airfoil, airfoil design, aerodynamics, airfoil oscillation, finite span airfoil

ABSTRACT: Previous reports have described theoretical methods for calculating the non-stationary aerodynamic characteristics of airfoils (S. M. Belotserkovskiy). In the present paper, the authors have investigated some premises of linear theory for possible verification. For example, they investigated the longitudinal and transverse oscillations of rectangular airfoils and the longitudinal oscillations of triangular airfoils of varying thickness in a low-velocity wind tunnel. Experimental points showing damping in pitch for rotary motion are shown in Fig. 1 of the Enclosure. The flow around oscillating airfoils was then investigated using capron, silk and glass fiber threads, separately and in combination with wire. The results were the same even when the specific gravity of the thread was increased five times. The best results were obtained at normal air humidity,

Card 1/6

since this counteracted the effect of electrostatic charges on the threads. Some representative results are illustrated. Other tests indicated that the non-stationary characteristics of airfoils are in direct ratio to the oscillation amplitude and angle of attack for harmonic oscillations along the transverse axis at low amplitudes. At the same time, for stationary characteristics, the direct ratio is violated at high angles of attack. The results of dynamometric measurements become apparent when they are analyzed together with the results of flow around the airfoil. Experimental data on coefficients of rotary derivatives conform with the linear theory for airfoils of average thickness, the highest discrepancies being observed for thin airfoils. Rear centering of these airfoils results in self-excited oscillations caused by separated flow at the front part of the airfoil. The highest discrepancies are found with front centering of thick airfoils, due to the small area of separation at the rear of the airfoil. For harmonic oscillations of the airfoil along the longitudinal axis, the closest results for experimental and design data are obtained with thin airfoils and low angles of attack (see Fig. 2 in the Enclosure). Testing with a screen showed that at low angles of attack and relatively long distances between the model and screen, the theoretical and experimental data were not far from each other (Fig. 3). In

ACCESSION NR: AP4043903

conclusion, the authors note that for incompressible fluids, the basic hypothesis is the assumption of smooth flow around an oscillating airfoil, resulting in close plotting of experimental and theoretical data. Orig. art. has: 7 figures and 6 equations.

ASSOCIATION: none

SUBMITTED: 20Mar64 ENCL: 03

SUB CODE: AC, ME NO REF SOV: 002 OTHER: 000

Card 3/6

ACCESSION NR: AP4043903

ENCLOSURE: 01

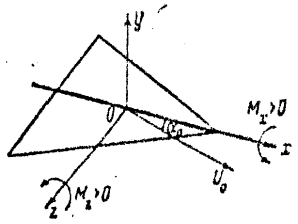


Figure 1.

Card 4/6

ACCESSION NR: AP4043903

ENCLOSURE: 02

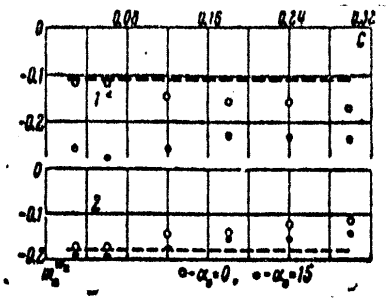


Figure 2.

Card 5/6

ACCESSION NR: AP4043903

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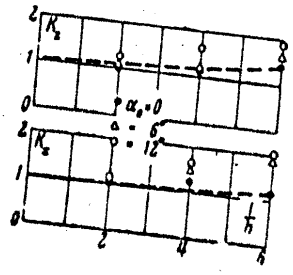


Figure 3.

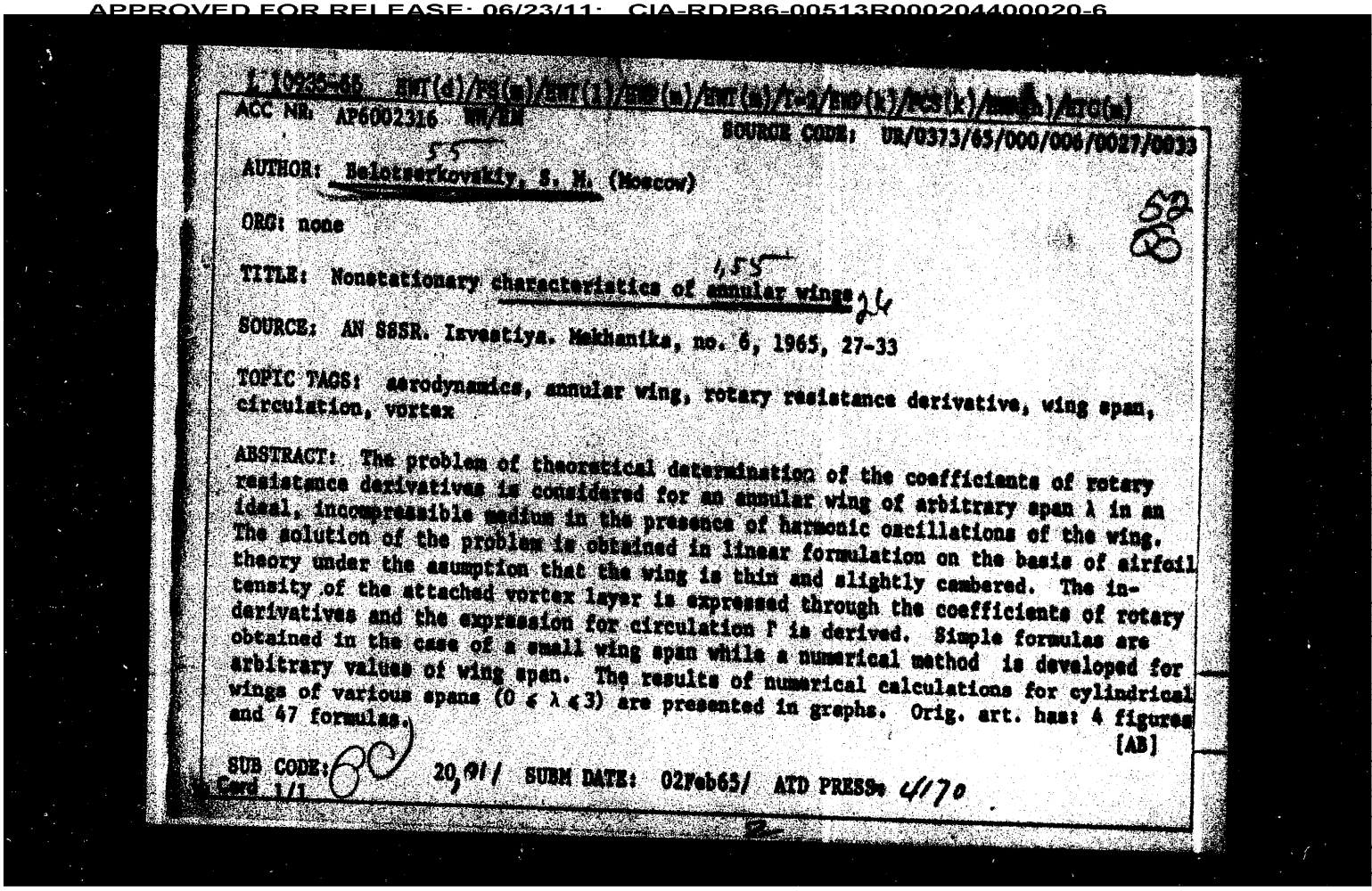
Card 6/6

BELOTSERKOVSKIY, Sergey Mikhaylovich; MOZAL'SKAYA, N.I., red.

[Thin lifting surface in a subsonic gas flow] Tonkaia nesushchaia poverkhnost' v dozvukovom potoke gaza. Moskva, Nauka, 1965. 242 p. (MIRA 18:4)

BELOTSERKOVSKIY, S.M. (Moskva); SKRIPACH, B.K. (Moskva); TABACHNIKOV, V.G. (Moskva)

Determination of the nonstationary aerodynamic characteristics of cones. Izv. AN SSSR Mekh. i mashinostr. no.5:140-141 S-O '64 (MIRA 18:1)



L 10925-66 EWT(d)/FS(v)/EWT(l)/EWP(v)/EWP(k)/FCS(k)/EWA(h)/ETC(m)

ACC NR: AP6002316 WW/RM SOURCE CODE: UR/0373/65/000/006/0027/0033

AUTHOR: Belotserkovskiy, S. M. (Moscow) 55

ORG: none

TITLE: Nonstationary characteristics of annular wings 44,55

SOURCE: AN SSSR. Izvestiya. Mekhanika, no. 6, 1965, 27-33

TOPIC TAGS: aerodynamics, annular wing, rotary resistance derivative, wing span, circulation, vortex

ABSTRACT: The problem of theoretical determination of the coefficients of rotary resistance derivatives is considered for an annular wing of arbitrary span λ in an ideal, incompressible medium in the presence of harmonic oscillations of the wing. The solution of the problem is obtained in linear formulation on the basis of airfoil theory under the assumption that the wing is thin and slightly cambered. The intensity of the attached vortex layer is expressed through the coefficients of rotary derivatives and the expression for circulation Γ is derived. Simple formulas are obtained in the case of a small wing span while a numerical method is developed for arbitrary values of wing span. The results of numerical calculations for cylindrical wings of various spans ($0 \leq \lambda \leq 3$) are presented in graphs. Orig. art. has: 4 figures and 47 formulas. [AB]

SUB CODE: 20, 01 / SUBM DATE: 02Feb65/ ATD PRESS: 4170

Card 1/1

BELOTSERKOVSKIY, S.M. (Moskva)

Unsteady characteristics of annular airfoils. Izv. AN SSSR. Mekh. no.6:27-33 N-D '65. (MIRA 18:12)

L 20636-66 EWT(d)/FS(n)/EWT(1)/EWP(m)/EWT(m)/EWP(w)/EWA(d)/T-2/EWP(k)/EWA(h)/
ACC NR: AP6010841 ETC(m)-6/EWA(1) SOURCE CODE: UR/0421/66/000/001/0051/0060
IJP(c) EM

AUTHOR: Belotserkovskiy, S. M. (Moscow)

ORG: none

TITLE: Method of calculating the effect of gusts on an arbitrary thin wing

SOURCE: AN SSSR. Izvestiya. Mekhanika zhidkosti i gaza, no. 1, 1966, 51-60

TOPIC TAGS: aerodynamics, unsteady flow, incompressible flow, aerodynamic characteristic, aerodynamic lift, aircraft wing, vortex flow, gust load, lifting surface

ABSTRACT: A numerical method of calculating unsteady, incompressible gas flows past a thin wing is developed assuming the arbitrary dependence of boundary conditions on time and coordinates. This makes it possible to consider the wing as a solid body in aperiodic motion, the arbitrary deformations, gust entry, the effect of a weak shock wave, etc. The basic idea of this numerical method of solution lies in the transition from continuous to discrete distributions and processes, that is, the continuously distributed vortex layer which replaces the wing is simulated approximately by a system of discrete vortices and the continuous process of time variation of the boundary condition and circulation is replaced by a step-by-step variation. This makes it possible to consider the steady vortex as the basic elementary system. The vortex model of the wing is analyzed and the locations of vortices are determined. Equations describing the nondimensional circulations of total vortices on the wing and

Card 1/3

65
B

free vortices behind it are derived and a recurrence relation is established for determining the circulations of bounded vortices. The aerodynamic properties of the wing are calculated from circulations of bounded vortices according to Zhukovsky's theorem "in the small"

$$\Delta p = -p\gamma_+ W_{oon},$$

where W_{oon} is the normal to vortex axis, γ_+ is the component of the relative velocity at a point associated with the vortex layer, and ρ is the density of the medium. Some numerical examples are given, among them the time variation of the lift coefficient and

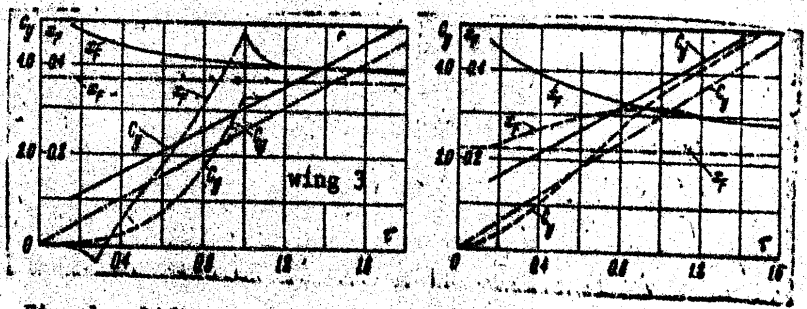
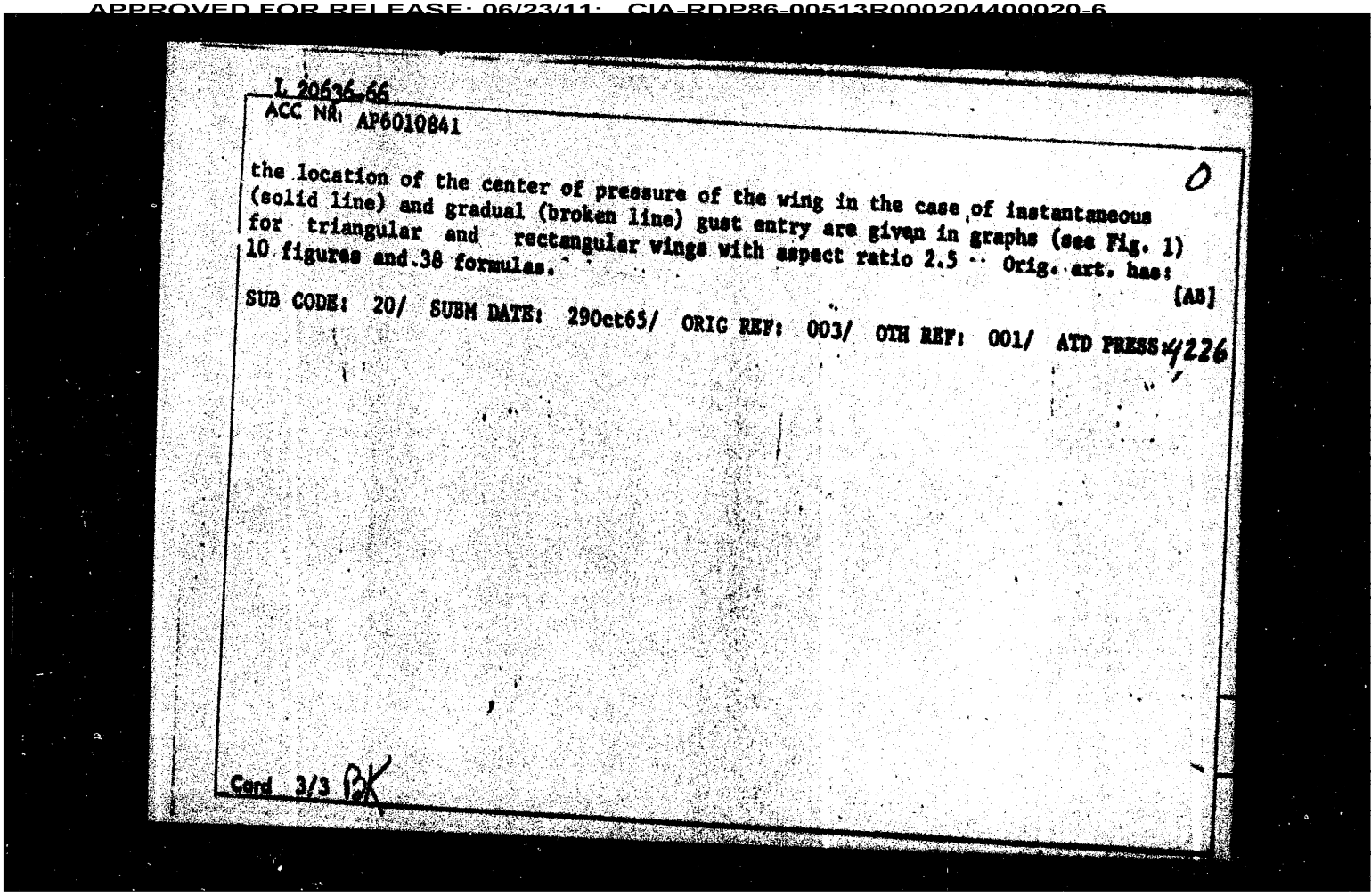


Fig. 1. Lift coefficient and center of pressure location versus time



L 20636-66
ACC NR: AP6010841

the location of the center of pressure of the wing in the case of instantaneous (solid line) and gradual (broken line) gust entry are given in graphs (see Fig. 1) for triangular and rectangular wings with aspect ratio 2.5 .. Orig. art. has: 10 figures and 38 formulas.

[AB]

SUB CODE: 20/ SUBM DATE: 29Oct65/ ORIG REF: 003/ OTH REF: 001/ ATD PRESS: 4226

Card 3/3 BK

L 29850-66

ACC NR: AP6013224 SOURCE CODE: UR/0421/66/000/002/0171/0174

AUTHOR: Belotserkovskiy, S. M. (Moscow); Ul'yanov, B. I. (Moscow); Khomenko, V. S. (Moscow)

ORG: none

TITLE: Some questions in the method of measuring instantaneous pressures

SOURCE: AN SSSR. Izvestiya. Mekhanika zhidkosti i gaza, no. 2, 1966, 171-174

TOPIC TAGS: pressure measurement, aerodynamic load, harmonic vibration

ABSTRACT: The article considers certain questions involved in the method of measuring unsteady state aerodynamic loads with harmonic vibrations of the model, at a constant mean flow velocity and small vibration amplitudes. In determination of unsteady state loads by the method of pressure measurements, use is made of a standard system of coordinates connected with the body; the unsteady state motion of the body is characterized by the following dimensionless kinematic parameters which are functions of time, t:

Card 1/2

L 29850-66

ACC NR: AP6013224

$$\alpha,\ \beta,\ \alpha' = \frac{d\alpha}{dt}\frac{b}{U_0},\quad \beta' = \frac{d\beta}{dt}\frac{b}{U_0},\quad \omega_x = \frac{\Omega_x b}{U_0}$$

$$\omega_x' = \frac{d\Omega_x}{dt}\frac{b^2}{U_0^2},\quad \omega_z = \frac{\Omega_z b}{U_0},\quad \omega_z' = \frac{d\Omega_z}{dt}\frac{b^2}{U_0^2} \qquad (1.1)$$

Here U_0 is the velocity of the movable origin 0 (the velocity of the flow) which is assumed to bonstant; b is the characteristic linear dimension. In regard to the measurements, the article contains a detailed discussion of dynamic calibration and of the effect of the different parameters on the error of the measurements. Orig. art. has: 7 formulas and 8 figures.

SUB CODE: 20/ SUBM DATE: 17Mar65/ ORIG REF: 004

Card 2/2 FV

ACC NR: AP7001572 SOURCE CODE: UR/0421/66/000/006/0074/0080

AUTHOR: Belotserkovskiy, S. M. (Moscow)

ORG: none

TITLE: Singularities in calculating subsonic flows past wings of complex shapes

SOURCE: AN SSSR. Izvestiya, Mekhanika zhidkosti i gaza, no. 6, 1966, 74-80

TOPIC TAGS: subsonic aerodynamics, aerodynamic characteristic, aerodynamic lift, lift coefficient, vortex flow, swept wing, variable geometry wing

ABSTRACT: Special features characterizing the calculation of main and distributed aerodynamic characteristics of complex monoplane wings such as: wings with discontinuities in leading and trailing edges, with curvilinear edges, and wings with variable geometry are considered. The effects of geometrical parameters and the Mach number on the aerodynamic characteristics of these wings are analyzed by using the method developed by the author in his three previous works, where the continuous vortex layer is replaced by a discrete system of oblique, horseshoe shaped vortices. The problem of steady motion of a wing with no slip at an angle of attack is considered and expressions for induced drag for wings with sharp and profiled leading edges are established. As an example the proposed technique is used to calculate subsonic flows past two most characteristic shapes, that is a variable-geometry F-111 wing and a "Concorde" type wing. The variations of the lift coefficient with M for both wings,

Card 1/2

ACC NR: AP7001572

location of the aerodynamic center with angle of sweep for F-111 configuration and with M for "Concorde" type wing are given in graphs. A comparison of calculated values with available experimental data on the "Concorde" wing with sharp and profiled leading edges is included. Orig. art. has: 7 figures and 25 formulas. [AB]

SUB CODE: 20/ SUBM DATE: 27Jul66/ ORIG REF: 003/ OTH REF: 001/
ATD PRESS: 5110

Card 2/2

ACC NR: AP7005653 SOURCE CODE: UR/0413/67/000/002/0107/0107

INVENTOR: Belotserkovskiy, S. M.; Bedenko, A. A.; Odnovol, L. A.

ORG: None

TITLE: A device for determining the rotational derivatives of models studied in aerodynamic installations. Class 42, No. 190634

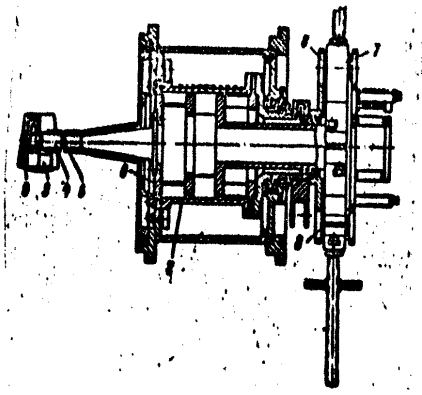
SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 2, 1967, 107

TOPIC TAGS: aerodynamic test, wind tunnel instrumentation, strain gage

ABSTRACT: This Author's Certificate introduces a device for determining the rotational derivatives of models studied in aerodynamic installations. The unit consists of a housing, extensometer and compensator including levers with weights. Experimental accuracy is improved by using a hollow holder rigidly connected to the covering of the device. The tail section of the model to be studied is mounted on this holder, and a second holder for the forward section of the model is fastened to the extensometer which is mounted inside the casing. The compensator is connected to the casing through elastic hinges and reduces the effect which the moment of inertia of the model has on the sensing element of the extensometer.

Card 1/2 UDC: 620.178

ACC NR: AP7005653

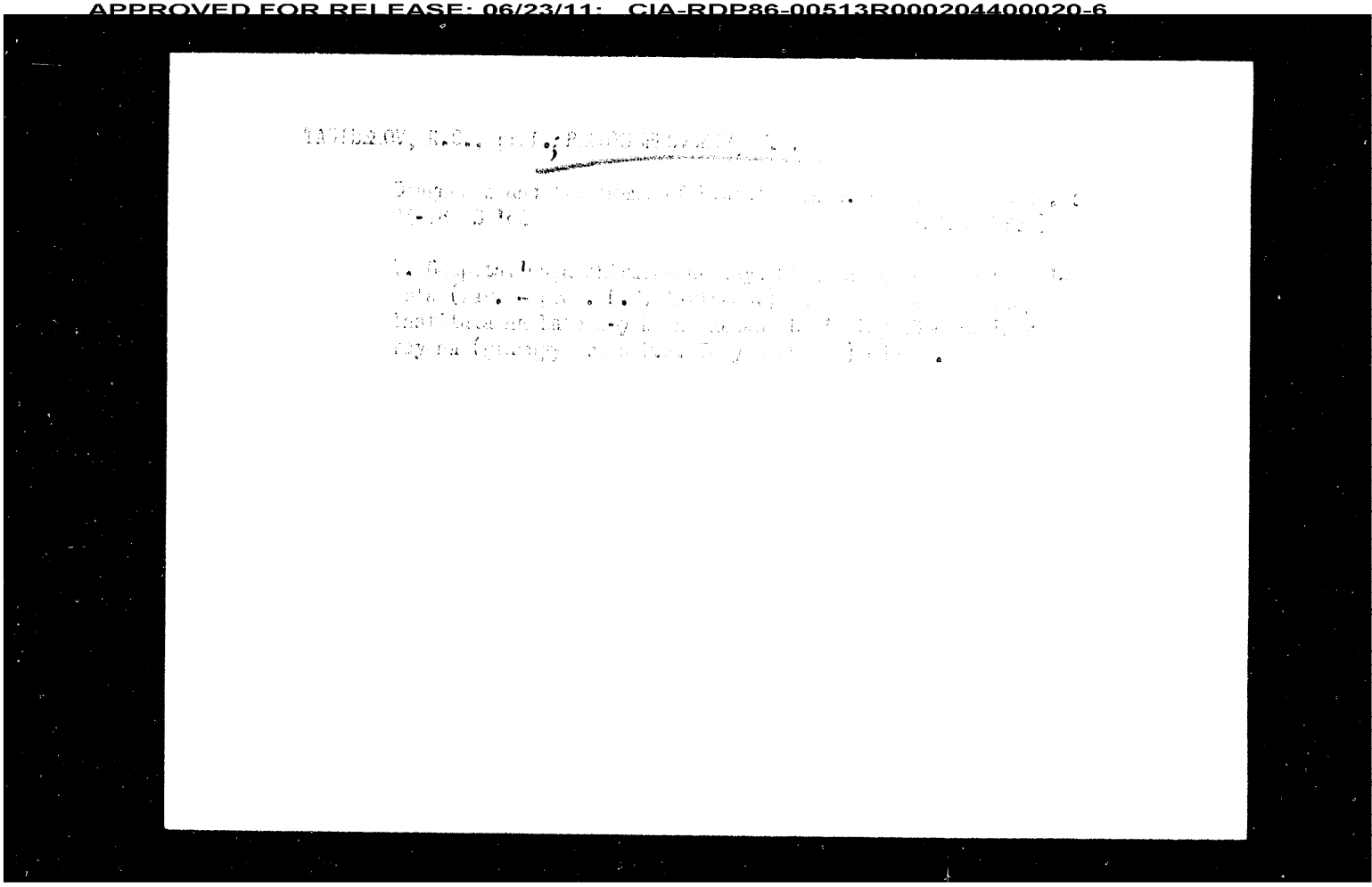


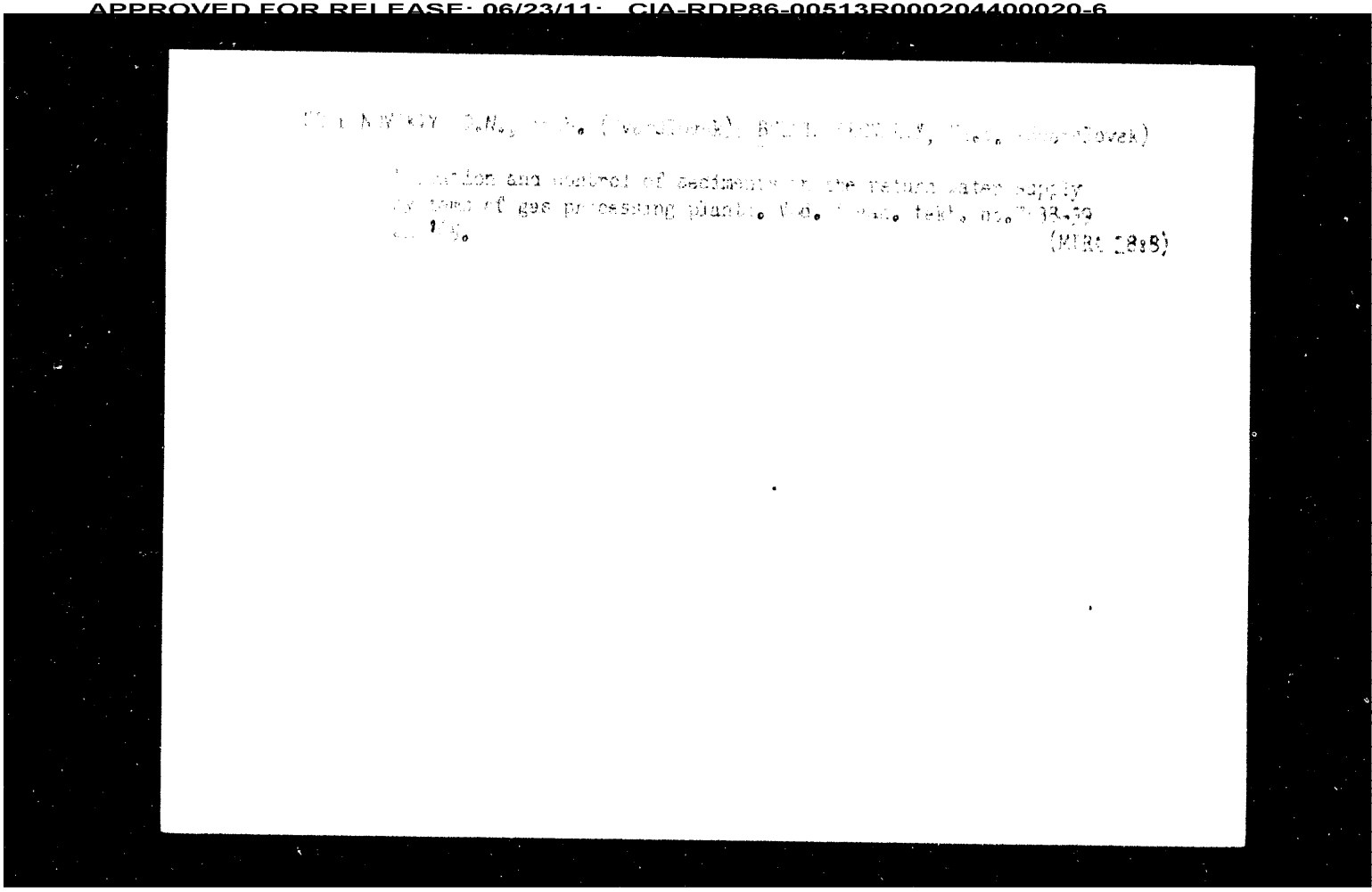
1--hollow holder; 2--casing; 3--tail section of the model; 4--holder; 5--forward section of the model; 6--extensometer; 7--compensator; 8--hinges

SUB CODE: 20, 21/ SUBM DATE: 28Sep65

Card 2/2

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204400020-6





BELOTSERKOVSKIY, Ya.L.; GRABENOVSKIY, O.N.

Gas purification conditions without the use of an electrostatic precipitator. Mat. i gornorud. prom. no.3:12-14 My-Je '65. (MIRA 18:11)

L 32581-66
ACC NR: AP5021509 (A) SOURCE CODE: UR/0327/65/000/007/0038/0039

AUTHOR: Grabenovskiy, O. N.; Belotserkovskiy, Ya. L. 1 B

ORG: none

TITLE: Formation of sedimentation in a turnover water supply system of gas purifiers and methods of its prevention

SOURCE: Vodosnabzheniye i sanitarnaya tekhnika, no. 7, 1965, 38-39

TOPIC TAGS: blast furnace, water supply system

ABSTRACT: The author notes that sediments are formed in the water systems of blast-furnace gas purifiers. The basic elements of such sediments are calcium and magnesium compounds (44-50%), which are detrimental to the process of purification and moreover result in an overexpenditure of electric power. A description is given of the various causes for the formation of sedimentation and it is stated that sedimentation may be cleared away by using either chemical, hydropneumatic or mechanical methods. Chemical cleaning is done by using reagents (such as hydrochloric or sulfuric acids) to dissolve or loosen the sediments, and that in order to prevent corrosion in the pipes and pump, inhibitors are added to the flushing solutions. The hydropneumatic cleaning is achieved by pressurized air and water

UDC 628.175:669.162.2

Card 1/2

Country : USSR
Category : Weeds and Their Control N

Abs Jour. : Ref. Zhur.-Biologiya No. 11, 1958. No. 49210

Author : Belotserkovskiy, Ye.
Institute : Not given
Title : Methods of Destroying Dodder

Orig. Pub.: S. kh. Tadzhikistana, 1957, No. 8, 30-33

Abstract : No abstract

Card: 1/1

MIRONCHIK, K., kand.med.nauk, starshiy nauchnyy sotrudnik; PRIPUTINA, L., kand.med.nauk, starshiy nauchnyy sotrudnik; BELOTSKAYA, V., inzh.-tekhnolog

Rational feeding of workers operating in high temperature shops. Obshchestv.pit. no.8:23-26 Ag '62. (MIRA 16:10)

1. Ukrainskiy nauchno-issledovatel'skiy institut pishchevoy promyshlennosti (for Mironchik, Priputina).

YUDAYEVA, V., inzhener-tekhnolog; BELOTSKAYA, V., inzhener-tekhnolog; DEMCHENKO, M.

Ukrainian cookery. Obshchestv.pit. no.1:25-26 Ja '63. (MIRA 16:4)

1. Starshiy inzhener-tekhnolog otdela obshchestvennogo pitaniya Ukrainskogo nauchno-issledovatel'skogo instituta torgovli i obshchestvennogo pitaniya (for Demchenko).
(Cookery, Ukrainian)

BELOUSEPAVSKIY, Z.B.

Rheocardiography and systolic periods in extrasystoles. Kardiologiia no.3:41-47 '65. (MIRA 18:10)

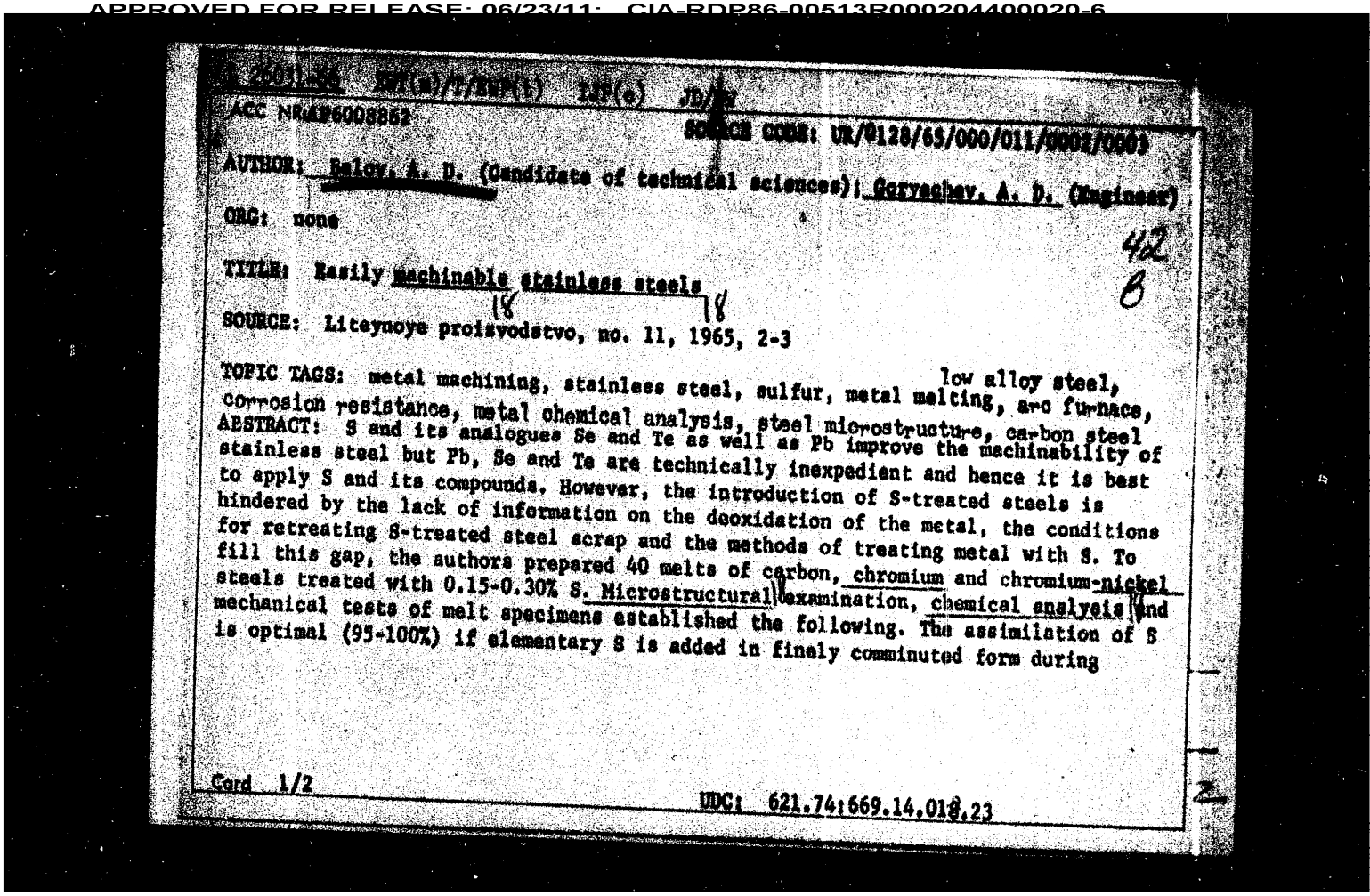
1. Kabinet funktsional'noy diagnostiki (zav. V.V.Kogan-Yasnyy) Gorodskogo vrachebno-fizkul'turnogo dispansera No.1 (glavnyy vrach - I.N.Markov), Moskva.

BELOTSKII, A.; TODOROV, R.; KOSHNOVIK, G.

"Concerning the behavior of silicon in tempering white cast iron."

TEZHKA PROMISHLENOST, Sofiia, Bulgaria, Vol. 8, no. 3, Mar. 1959

Monthly list of East Europe Accessions (EEAI), LC, Vol. 8, No. 6, Sept 59
Unclas



L 26031-66 EWT(m)/T/EWP(t) IJP(c) JD/JW

ACC NR: AP6008862 SOURCE CODE: UR/0128/65/000/011/0002/0003

AUTHOR: Baiov, A. D. (Candidate of technical sciences); Goryachev, A. D. (Engineer)

ORG: none

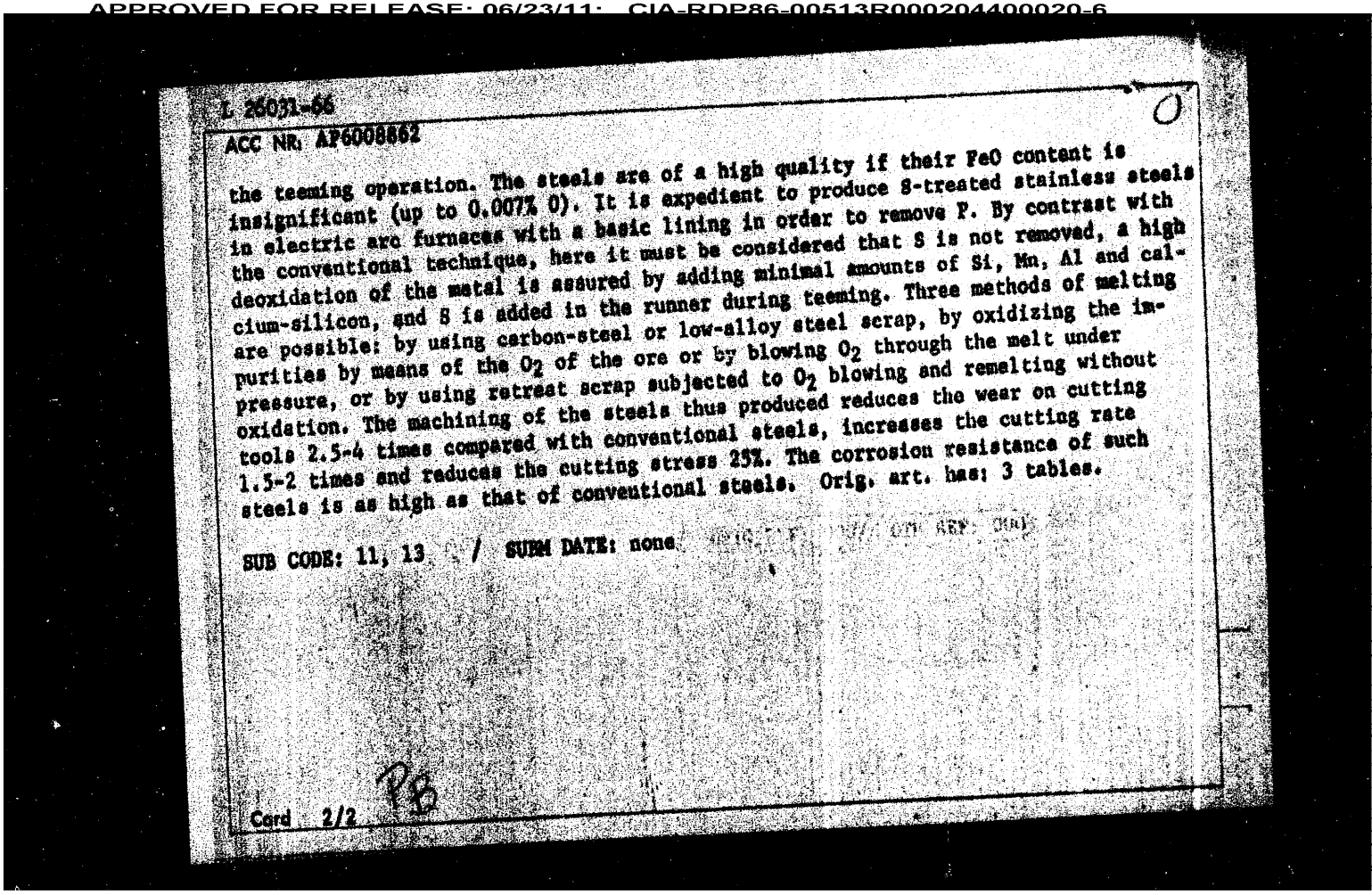
TITLE: Easily machinable stainless steels

SOURCE: Liteynoye proizvodstvo, no. 11, 1965, 2-3

TOPIC TAGS: metal machining, stainless steel, sulfur, metal melting, arc furnace, low alloy steel, corrosion resistance, metal chemical analysis, steel microstructure, carbon steel

ABSTRACT: S and its analogues Se and Te as well as Pb improve the machinability of stainless steel but Pb, Se and Te are technically inexpedient and hence it is best to apply S and its compounds. However, the introduction of S-treated steels is hindered by the lack of information on the deoxidation of the metal, the conditions for retreating S-treated steel scrap and the methods of treating metal with S. To fill this gap, the authors prepared 40 melts of carbon, chromium and chromium-nickel steels treated with 0.15-0.30% S. Microstructural examination, chemical analysis and mechanical tests of melt specimens established the following. The assimilation of S is optimal (95-100%) if elementary S is added in finely comminuted form during

Card 1/2 UDC: 621.74:669.14.018.23



L 26031-66

ACC NR: AP6008862

the teeming operation. The steels are of a high quality if their FeO content is insignificant (up to 0.007% O). It is expedient to produce S-treated stainless steels in electric arc furnaces with a basic lining in order to remove P. By contrast with the conventional technique, here it must be considered that S is not removed, a high deoxidation of the metal is assured by adding minimal amounts of Si, Mn, Al and calcium-silicon, and S is added in the runner during teeming. Three methods of melting are possible: by using carbon-steel or low-alloy steel scrap, by oxidizing the impurities by means of the O_2 of the ore or by blowing O_2 through the melt under pressure, or by using retreat scrap subjected to O_2 blowing and remelting without oxidation. The machining of the steels thus produced reduces the wear on cutting tools 2.5-4 times compared with conventional steels, increases the cutting rate 1.5-2 times and reduces the cutting stress 25%. The corrosion resistance of such steels is as high as that of conventional steels. Orig. art. has: 3 tables.

SUB CODE: 11, 13 / SUBM DATE: none

Card 2/2

AUTHORS: Belotskiy, A.V., Gridnev, V.N., Sklyarov, O.Ye. 32-12-4-1/71

TITLE: The Ion-X-Ray Tube With Revolving Anode (Ionnaya rentgenovskaya trubka s vrashchayushchimsya anodom).

PERIODICAL: Zavodskaya Laboratoriya, 1957, Vol. 23, Nr 12, pp. 1499-1500 (USSR)

ABSTRACT: The new construction of this tube suggested in this paper consists of a tube-shaped stand fastened onto a table; it has a central projection into the upper part of which a porcelain tube (insulator) in a conical box is introduced. On the upper end of the porcelain tube there is a special device which is connected with the cathode holder together with the cathode in the interior of the tube. Here the cathode may be adjusted from the outside. The anode is in the lower part of the central projection and is fitted on to the mobile end of the anode shaft. The anode shaft itself is horizontal, has roller bearings, and as packing a number of rubber washers with metal fittings are used. The anode shaft is driven by an electromotor which is fastened beside the apparatus on the plate of the table. The anode shaft together with the driving disk are constructed in such a manner that the anode shaft is adjustable in the horizontal direction in order that at its end in the interior of the apparatus the anode

Card 1/2

The Ion-X-Ray Tube With Revolving Anode

32-12-41/71

together with the sample can be mounted or removed. In certain cases the anode can be replaced by a prism upon the surfaces of which the necessary metal layers are fixed. The anode may be used while at rest, and the focus spot is used up to 2.5 mm at 10-12 mA and 35 kV of the specular iron of the anode. In the case of a revolving anode the number of revolutions is 450-500 per minute with a current of up to 25 mA, 35-40 kV, and a focus spot of 0.8-1.0 mm is provided (in the case of continuous stress). There are 2 figures.

ASSOCIATION: Kiyev Polytechnic Institut (Kiyevskiy politekhnicheskiy institut).

AVAILABLE: Library of Congress

Card 2/2 1. Tubes-Construction methods

PERMYAKOV, V.G., dots., kand.tekhn.nauk; BELOTSKIY, A.V., inzh.

X-ray temper examination in annealed, nitrided iron. Izv.vys.ucheb.zav.; chern.met. no.11:99-104 N '58. (MIRA 12:1)

1. Kiyevskiy politekhnicheskiy institut. Rekomendovano kafedroy metallovedeniya i termoobrabotki.
(Iron--Metallography) (Tempering) (Case hardening)

BELOTSKIY, A.V.; GRIDNEV, V.N.

High-temperature X-ray camera. Zav. lab. 24 no.5:643 '58.
(MIRA 11:6)

1. Kiyevskiy politekhnicheskiy institut.
(X rays--Equipment and supplies)

BELOTSKIY A.V.

Camera for the precise determination of crystal lattice constants at high temperatures. Zav.lab. no.11:1397 '59. (MIRA 13:4)

1.Kiyevskiy politekhnicheskiy institut.
(Crystal lattices) (X rays - Equipment and supplies)

S/148/60/000/006/004/010

18.7500

AUTHORS: Belotskiy, A. V., Gridnev, V. N.

TITLE: A New Method of Investigating the Dissolving of the Carbide Phase in Austenite During Electric Heating

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Chernaya metallurgiya, 1960, No. 6, p. 95-102

TEXT: A new method is suggested of examining the dissolving of the carbide phase during heating of steel. The method is based on the X-ray structural analysis of supercooled austenite with simultaneous checking of the process by the dilatometric method. The specimens are heated up to different temperatures, they are then supercooled to the temperature range of higher stability of supercooled austenite. Subsequently the X-ray exposure is made. For this purpose a high-temperature X-ray chamber with a dilatometer was designed with the participation of O. Ye Sklyarov. During heating of the specimens the simultaneous optical recording of thermal and dilatometric curves is performed, so that the temperature and the nature of occurring processes may be checked. The chamber and its electric circuit are described in detail and illustrated. Various steel grades (40, У8А (U8A), У12А (U12A) and У16 (U16)

Card 1/3

A New Method of Investigating the Dissolving of the Carbide Phase in Austenite During Electric Heating.

were examined. Their composition is given. Strip-shaped specimens of 4.0 x 0.5 mm cross section were heated for 3-4 seconds by power frequency current at a rate of 350 degrees/sec up to different temperatures and were cooled down to the temperature of isothermal holding (300°C). The X-ray exposure did not exceed 1 minute so that changes in the lattice constant of the supercooled austenite were checked every minute. The X-ray patterns served to study the kinetics of carbide dissolving and the dissociation of supercooled austenite. Changes in the lattice constant depending on the heating temperature show (Figure 7) that for high carbon steels with an initial granular structure the austenite can be recorded at 800-810°C, i. e. after heating above the critical point by 30-40°. Under these conditions the carbon content in the austenite attains 0.5-0.6%. Curves are presented (Figure 7) which show the dependence of the lattice constant of supercooled austenite on the heating temperature for various steel grades. They may be used to determine the temperature of the completed dissolving of the carbide phase during heating of the steel. This temperature is 880-890°C for U8A steel; 920-930°C for U12A steel and 1,010-1,020°C for U16 steel. There are 2 diagrams, 4 graphs, 1 circuit diagram, 1 x-ray pattern and 8 references:

02581

S/148/60/000/006/

A New Method of Investigating the Dissolving of the Carbide Phase in A
During Electric Heating

7 Soviet and 1 German.

ASSOCIATION: Kiyevskiy politekhnicheskiy institut (Kiyev Polytechni
Institute)

SUBMITTED: September 26, 1959.

Card 3/3

S/148/60/000/010/015/018
A161/A030

AUTHORS: Permyakov, V.G.; Todorov, R.P.; Koshovnik, G.I.; Belotskiy, A.V.

TITLE: The Effect of Homogenizing on the Redistribution of Silicon and the Mechanical Properties of Magnesium Cast Iron With Grey Fracture

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Chernaya metallurgiya, 1960, No. 10, pp. 143 - 147

TEXT: Cast iron with 3.51% C; 3.36% Si; 0.39% Mn; 0.10% P; 0.008% S; and 0.053% Mg has been studied before and after homogenizing in 1,050°C. Uneven Si distribution was revealed in the state before homogenizing, with the highest concentration at graphite inclusions (Fig. 1), along with reduced C content in these spots and the lowest quantity of residual austenite at the graphite globules, due to the mutual displacing effect of C and Si. Holding in 1,050° homogenized the structure. The effect was studied with an x-ray camera in cobalt anode radiation using the inverse method. The α-phase line (310) was phocused at 60 mm distance between the specimen and the film, and armco iron with a total impurities content maximum 0.05% was used as the reference piece; the x-ray camera was a "1 KROS" (1 KROS). The variation of photometric curves (Fig. 3) indicated high

Card 1/2

S/148/60/000/010/015/018
A161/A030

The Effect of Homogenizing on the Redistribution of Silicon and the Mechanical Properties of Magnesium Cast Iron With Grey Fracture

heterogeneity of α-phase before homogenizing. The microhardness of ferrite was measured with a ПМТ-3 (PMT-3) apparatus. The results (Fig. 4) show that the difference in the hardness values gradually disappeared. Ferrite was practically fully homogenized after 17 hours holding at 1,050°. Dilatometric determinations (Fig. 5) proved that the second phase of graphitization reduced rapidly at the beginning and smoothly evened out as time went on. The decomposition of eutectic carbides stabilized after 6 - 7 h. The change in mechanical properties was studied on iron specimens of a slightly different composition. The results are illustrated by curves (Fig. 6) and show a slight drop of strength and hardness but an improved plasticity. It is apparent that brittleness before homogenizing is caused by Si concentration in spots, and that the improved plastic properties of iron are due to redistribution of Si. It is obvious that homogenizing must preceed the second graphitization stage in cases when a high plasticity of castings is wanted. There are 6 figures.

ASSOCIATION: Kiyevskiy politekhnicheskiy institut (Kiyev Polytechnical Institute)
SUBMITTED: January 7, 1960

Card 2/2

BELOTSKIY, A. V., CAND TECH SCI, "~~INVESTIGATION~~ OF THE KINETICS OF DIFFUSION OF THE CARBIDE PHASE IN ELECTRON TEMPERING OF CARBON AND ALLOYED STEELS." DNEPROPETROVSK, 1961. (MIN OF HIGHER AND SEC SPEC ED UKSSR. DNEPROPETROVSK ORDER OF LABOR RED BANNER METALLURGICAL INST). (KL-DV, 11-61, 217).

S/137/62/000/004/086/201
A052/A101

AUTHOR: Belotskiy, A. V.

TITLE: The solution kinetics of carbide phase at the electric heating of Fe-Cr-C alloys

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 4, 1962, 12, abstract 4I80 ("Sb. nauchn. tr. aspirantov Kiyevsk. politekhn. in-ta." Kiyev, 1961, 193 - 202)

TEXT: Samples of Fe-Cr-C alloys containing 1.80 - 6.76% Cr and 0.02% C and also ШХ6 (ShKh6), ШХ 15 (ShKh15) and Х 3 (Kh3) steels were heated with alternating current to temperatures $> Ac_1$, and at an isothermic exposure a series of radiograms of stable austenite were taken at the same temperature or, after heating to these temperatures and a sharp cooling to 320°C (the region of an increased stability of austenite), an X-ray diffraction study was carried out, too. The solubility of carbides was determined by measuring the crystalline lattice parameters of austenite. The rate of carbide phase solution increases by linear law with the increase of temperature. The higher the Cr content the higher the tem-

Card 1/2

perature at which a full carbide phase solution takes place. In heating hardened alloys a carbide phase of a high degree of dispersion forms as a result of electric tempering, the rate of its solution increases sharply and a full solution ends at considerably lower temperatures. On the basis of the fact, that in the initial period of isothermic exposure it has been possible to detect austenite with a very low C content, it is supposed that at the initial moment of the phase transformation austenite emerges with a composition near to that of ferrite.

L. Vul'f

[Abstracter's note: Complete translation]

Card 2/2

18-7500 1155 1045 1454

S/148/61/000/002/010/011
A161/A133

AUTHORS: Belotskiy, A. V., Gridnev, V. N.

TITLE: Investigating the kinetics of the carbide phase diffusion in electrically heated Fe-Ni-C alloys

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Chernaya metallurgiya, no. 2, 1961, 114 - 121

TEXT: The investigation has been carried out in view of the carbide phase diffusion and austenite homogenation effect on the final structure and properties of hardened steel. The obtained data may provide the base for the development of an electric hardening process. The techniques consisted in observation of X-ray diffraction using a new kind of high-temperature X-ray camera with a dilatometer. It permitted the simultaneous recording of temperature and volume curves and a rapid succession of photographs. A description of the camera was given by the authors previously [Ref. 1: A. V. Belotskiy, V. N. Gridnev, Izv. vyssh. uch. zav. Chern. metallurgiya, no. 6, 1960]. Alloys were prepared from armco iron. The investigation results are given in detail and illustrated in graphs and one serial X-ray photo. The alloys contained 5% Ni and different quantities of C up to 1.1%

Card 1/2

27039

S/148/61/000/002/010/011
A161/A133

Investigating the kinetics of the carbide phase ...

The temperature of the complete diffusion of ferrite and austenite were determined. One graph shows the stated lattice spacing of stable and supercooled austenite. It has been proven that carbides are dissolving very rapidly (in considerably less than one minute) during isothermic electric heating above the critical range, and the diffusion process in nickel steel is very fast already in the phase transformation period. The information contains many data on the austenite lattice spacing variations at different nickel and carbon contents at different temperatures. There are 7 figures, 1 table and 1 Soviet reference.

ASSOCIATION: Kiyevskiy politekhnicheskiy institut (Kiyev, Polytechnical Institute)

SUBMITTED: July 4, 1960

Card 2/2

S/148/61/000/012/005/009
E071/E435

AUTHORS: Belotskiy, A.V., Gridnev, V.N.

TITLE: An investigation of the kinetics of dissolution of the carbide phase on electric heating of Fe-Cr-C alloys

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Chernaya metallurgiya, 4 no.12, 1961, 107-113

TEXT: Using the high temperature X-ray method, the velocity and completeness of dissolution of the carbide phase during electric heating of the following commercial Fe-Cr-C alloys (with an annealed initial structure) were studied: ШХ6 (ShKh6), ШХ15 (ShKh15), Х3 (Kh3), 4Х13 (4Kh13), Х18 (Kh18)

	C	Cr	Si	Mn	Ni	S	P	Type of carbide phase
ШХ6	1,1	0,67						
ШХ15	1,04	1,52	0,25	0,30	0,30	0,020	0 020	$(Fe, Cr)_3 C$
Х3	1,00	3,25	0,21	0,24	0 14	0,010	0,018	
4Х13	0,41	13,7	0,26	0,37	0,27	0,016	0,023	$(Fe, Cr)_{2,3} C_6 +$ $+ (Fe, Cr)_7 C_3$
Х18	0,93	18,2	0,24	0,55	0,18	0,025	0,028	$(Fe, Cr)_{2,3} C_6$

Card 1/5

Manganese radiation was used, the accuracy of determining the lattice spacing of austenite was ± 0.0015 kX. To determine the dependence of the lattice spacing of the austenite on its chromium content, synthetic alloys containing 0.2% C and from 1.8 to 6.76% Cr were used. Up to 7%, the chromium content has no influence on the lattice spacing of austenite. Therefore, graduated graphs prepared for carbon steel can be used for the determination of carbon in the solid solution of Fe-Cr-C alloys. Observation of the solution of the carbide phase on heating was based on changes of the lattice spacing of the austenite. It was found that under conditions of isothermal heating the solution of carbides depends mainly on the temperature and very little on the duration of the isothermal soaking. The most intensive dissolution of the carbide phase in ShKh6 and ShKh15 alloys occurs in the range 850 to 900°C. At higher temperatures carbides are completely dissolved during the first minutes. The position is different for high chromium steels. Even at the highest heating temperature (1050°C) the C-concentration of the austenite reaches only 0.35 to 0.4%. The low solubility of carbides in the austenite of these

steels is explained by the presence of special carbides not easily soluble in austenite. On heating high chromium alloys specimens which were first quenched from 1250°C, practically complete solubility of the carbide phase is achieved in the temperature range 950 to 1000°C. The solubility of the carbide phase on continuous electric heating with a velocity of 250°C/sec was also studied. After heating the specimens to various austenization temperatures, they immediately cooled to 320°C (range of increased stability of supercooled austenite) and the lattice spacing of austenite was determined. For each type of steel two initial structures were used: spheroidized (annealed for grained pearlite) and hardened. For ShKh6 steel with the annealed structure, the solubility of the carbide phase depends not only on temperature but also on the heating duration. The dissolution of the carbide phase is practically finished on heating to 1025 - 1050°C, while in the preliminary hardened specimen this is achieved at about 825°C. The solubility of the carbide phase of annealed specimens of ShKh15 steel is slower and even on reaching 1210°C the dissolution is not completed; about 0.1% of carbon remains combined in the carbide phase. The dissolution of

the carbide phase in hardened specimens increases sharply and is completed at 825 to 850°C. At high temperatures, hysteresis was observed for the dissolution of the carbide phase in annealed and hardened Kh3 steel. On heating annealed specimens to 1210°C about 25% of the carbon remains in the carbide phase while in hardened specimens the dissolution is practically finished on reaching about 950°C. In annealed 4Kh13 steel, the solution of carbides becomes noticeable only at temperatures of about 1160°C and at 1285°C only about 0.35% of carbon passes into the solid solution. On heating specimens which were preliminary hardened (from 1250°C, soaking 20 min), carbides pass into solutions at 1050 to 1080°C. The high velocity of solution and increased solubility of carbon in austenite on electric heating of preliminarily hardened high chromium steels are attributed to the appearance in the course of heating of a metastable, highly dispersed, carbide phase which is more soluble in austenite. There are 4 figures and 3 references: 2 Soviet-bloc and 1 non-Soviet-bloc. The reference to an English language publication reads as follows: Ref.2: K. Kuo. Journal Iron and

An investigation of the kinetics

S/148/61/000/012/005/009
E071/E435

Steel Inst., v.173, 1953, 363.

ASSOCIATION: Kiyevskiy politekhnicheskiy institut
(Kiyev Polytechnical Institute)

SUBMITTED: July 12, 1960

Card 5/5

S/126/63/015/003/002/025
E021/E139

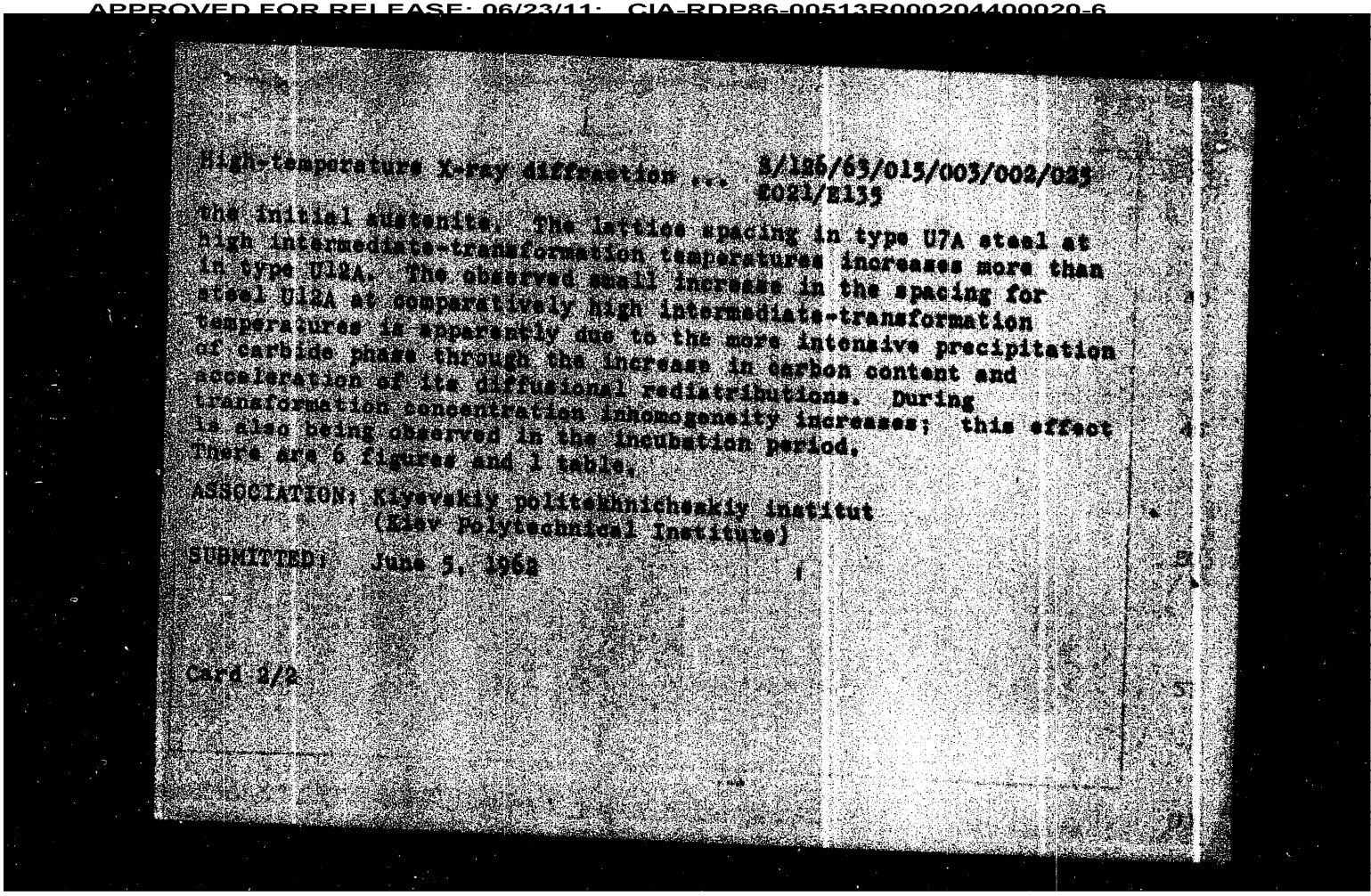
AUTHORS: Pereyakov, V.G., Belotskiy A.V., and Petrosyan, F.G.

TITLE: High-temperature x-ray diffraction study of the intermediate transformation of austenite in carbon steels

PERIODICAL: Fizika metallov i metallovedeniye, v.15, no.3, 1963, 334-338

TEXT: The X-ray investigations of the intermediate transformation of austenite which have been reported in the literature were carried out on steels with alloying elements stabilising austenite. The technique used in the present investigation gives rapid supercooling of austenite in the X-ray camera and allows the isothermal transformation to be studied directly at the transformation temperatures. Because of this, carbon and low-alloy steels can be used. The present work shows that in the type Y7A (U7A) and Y12A (U12A) steels studied, enrichment of austenite with carbon proceeds at all temperatures in the intermediate range because of diffusion, the extent and rate of enrichment increasing with decreasing carbon content in

Card 1/2



High-temperature X-ray diffraction ... S/126/63/015/003/002/025
E021/E135

the initial austenite. The lattice spacing in type U7A steel at high intermediate-transformation temperatures increases more than in type U12A. The observed small increase in the spacing for steel U12A at comparatively high intermediate-transformation temperatures is apparently due to the more intensive precipitation of carbide phase through the increase in carbon content and acceleration of its diffusional redistributions. During transformation concentration inhomogeneity increases; this effect is also being observed in the incubation period.
There are 6 figures and 1 table.

ASSOCIATION: Kiyevskiy politekhnicheskiy institut
(Kiev Polytechnical Institute)

SUBMITTED: June 5, 1962

Card 2/2

BELOTSKIY, A.V. (Kiyev); PERMYAKOV, V.G. (Kiyev); PETROSYAN, F.G. (Kiyev)

High-temperature X-ray examination of the intermediate transformation of austenite in an iron-nickel-carbon alloy. Izv. AN SSSR. Met. i gor. delo no.5:126-128 S-O '63. (MIRA 16:11)

BELOTSKIY, A.V.

Diffusion of cementite during the electric heating of carbon steel. Metalloved. i term. obr. met. no.2:41-43 F '64
(MIRA 17:7)

1. Kiyevskiy politekhnicheskiy institut.

BELOTSKIY, A.V. (Kiyev); PERMYAKOV, V.G. (Kiyev); PETROSYAN, F.G. (Kiyev); PET'KOV, V.V. (Kiyev)

Martensite character of the intermediate transformation of austenite. Izv. AN SSSR. Met. no.1:104-107 Ja-F '65. (MIRA 18:4)

L 24768-66 EWT(1)/EWT(m)/EWP(t) IJP(c) JD/JH

ACC NR: AP6015529 SOURCE CODE: UR/0370/65/000/001/0104/0107

AUTHOR: Belotskiy, A. V. (Kiev); Pomyakov, V. G. (Kiev); Petrosyan, F. G. (Kiev); Pet'kov, V. V. (Kiev)

ORG: none

TITLE: Martensitic character of the intermediate transformation of austenite

SOURCE: AN SSSR. Izvestiya. Metally, no. 1, 1965, 104-107

TOPIC TAGS: austenite, x ray diffraction, austenite transformation, isothermal transformation, steel/40N5 steel, 37KhN3A steel

ABSTRACT: This paper is a continuation of the author's investigation of the mechanisms and kinetics of the decomposition of supercooled austenite using rapid high-temperature X-ray diffraction. Below are set forth new experimental data on the state of the initial and formed phases which confirm the martensitic character of the intermediate transformation of supercooled austenite.

Used in the investigation were steel 40N5 (synthetic steel based on Armco iron) containing 0.41% C and 5.09% Ni, and steel 37KhN3A (0.38% C, 3.09% Ni, 1.35% Cr, 0.19% Si, 0.31% Mn). Austenization of the specimens was done by heating at an average rate of about 200 deg/sec up to 1000—1050°C (for

Card 1/4 UDC: 669.017.3: 621.78

steel 40N5) and 1100°C (for steel 37KhN3A) which provided the complete dissolving of the carbide phase in the austenite. The supercooled specimens was x-rayed at different periods of the isothermal transformation.

The initial transformation period at 300 and 340°C is characterized by the practically unchanged lattice period of the gamma-phase. Then the line widths of the gamma- and alpha-phases are changed insignificantly. Apparently, in this period the effects of carbon-enrichment of the austenite and the carbon precipitation from austenite (carbide phase formation) overlap and the lattice period of the untransformed part of the austenite is unchanged. An increase in the holding time for all transformation temperatures investigated causes a sharp reduction in the lattice period of the austenite and a reduction of the line widths of the transformation product of the austenite-alpha-phase.

These experimental data clearly characterize the successive stages of the development of the intermediate transformation of austenite. Thus, for example, the increased line widths of the gamma-phase in relation to the isothermal holding time is associated with the increased concentration inhomogeneity caused by diffusive carbon redistribution. This decomposition stage is characterized by the intense carbide formation because of the depletion of carbon-enriched portions of the austenite, as a result of which the lattice period of the austenite is reduced very sharply.

Very interesting data were obtained in the analysis of the width of the interference lines (211) of the alpha-phase. The transformed alpha-phase is characterized by different values of line widths in the initial and final stages of the process which occurs under isothermal conditions. The line widths differe substantially also in the case where the alpha-phase formation occurs at another, either higher or lower, temperature.

The line width value for annealed alpha-phase of steel 40N5 was determined in the intermediate temperature region. It was equal to 1.9 mm. The regularities of the intermediate austenite transformation in steel 37KhN3A were studied at 300, 340, 380, 420 and 460°C. At 300, 340, and 380°C austenite decomposition generally proceeds according to those same regularities as in steel 40N5. With an increase in the isothermal holding temperature from 420 to 480°C, homogeneous austenite gradually becomes inhomogeneous. The data on the sharp increase of the lattice period of carbon-enriched austenite, to a known degree, aid in understanding and explaining the causes for the increased stability of supercooled austenite in the upper part of the intermediate region. The line width of the alpha-phase emerging during autenite decomposition in steel 37KhN3A considerably exceeds the line width of the alpha-phase of annealed steel. If the line width, measured on annealed specimens in the temperature range of the intermediate transformation amounted to 2.0 mm, then the line width of the alpha-phase, emerging under the isothermal decompostion of austenite at 300°C at the beginning of the holding was 4.1 mm and at the finish, i.e., after 30 minutes, was 3.3

mm. At 420°C, the initial line width is equal to 3.2 mm, but after a one-hour hold is reduced to 2.7 mm.

Thus, the experimental data, obtained directly by rapid high-temperature x-ray diffraction at transformation temperatures, bear out the fact that the intermediate austenite transformation occurs according to a martensitic mechanism. Orig. art. has: 4 figures. [JPRS]

SUB CODE: 11, 20 / SUBM DATE: 16Dec63 / ORIG REF: 002

Card 4/4 JP

L 39110-66 EWT(m)/EWP(t)/ETI/ETC(k) IJP(c) JD

ACC NR: AP6030381 SOURCE CODE: UR/0148/66/000/004/0137/0141

AUTHOR: Vashchenko, K. I.; Firstov, A. N.; Belotskiy, A. V.; Duplyak, V. D.; Kostenko, G. D.

ORG: Kiev Polytechnical Institute (Kiyevskiy politekhnicheskiy institut)

TITLE: Structure and phase composition of the diffusion layer in bimetallic iron-aluminum castings

SOURCE: IVUZ. Chernaya metallurgiya, no. 4, 1966, 137-141

TOPIC TAGS: phase composition, binary alloy, iron aluminum alloy

ABSTRACT: The report studies the structure and phase composition of the diffusion layer of specimens of Armco iron (0.014 % C), steel grades 20 and U8 and cast iron grade SCh 21-40, aluminized at different temperatures and aged in a melt of pure aluminum or in an aluminum alloy with 4 % Si and 7 % Zn.

Cylindrical specimens 10 mm in diameter and 30 mm long were aluminized in small tanks of thin sheet iron 25 mm in diameter and 45 mm high which were immersed in a crucible containing the aluminum melt.

Specimens 18 mm in diameter and 70 mm long were aluminized directly in the crucible and then had the aluminum melt poured over them in a sand mold at a temperature of 720-730° C. From the bimetallic billets thus obtained sections and specimens for tensile testing were prepared.

Binary alloys were prepared in an electric arc crucibleless furnace with a protective (argon) atmosphere. Charge materials were Armco iron and AV00 grade aluminum.

Card 1/2

UDC: 669.15'71:621.18

L 39110-66

ACC NR: AP6030381

In the aluminizing of Armco iron in pure aluminum, the diffusion layer consisted of two zones: a thick zone of columnar crystallites adjoining the iron, and, considerably thicker, a fine crystalline zone (2-3 microns) adjoining the aluminum. The columnar crystallites grew predominantly in a direction perpendicular to the front of the reactive diffusion (toward the specimen surface) with the formation of characteristic protusions -- tongues.

Formation of the two-phase layer is the result of reactive diffusion in the solid iron - aluminum melt system: the diffusion of aluminum atoms promotes the growth of columnar crystallites and the overall thickness of the layer, and in the straightforward diffusion of iron, atoms change in the condition of equilibrium of the system which leads to a decrease in layer thickness. From the thermodynamic point of view, this phenomenon boils down to an increase in entropy of displacement and decrease in the free energy of the system and, therefore, proceeds spontaneously and irreversibly.

The results of microstructural and chemical analyses were confirmed by roentgenographic investigation. Orig. art. has: 3 figures. [JPRS: 36,728]

SUB CODE: 11 / SUBM DATE: 13Apr65 / ORIG REF: 005 / OTH REF: 009

Card 2/2 MLP

BELOTSKIY, D. P.

Dissertation: "The Physicochemical Analysis of a Ternary System: Ethyl Alcohol-Aniline-Chloroform." Cand Chem Sci, Khar'kov State U, Khar'kov, 1953. (Referativnyy Zhurnal--Khimiya, Moscow, No 6, Mar 54)

SO: SUM 243, 19 Oct 1954

ILLEGIBLE

BELOTSKIY, D.P.

USSR/Physical Chemistry - Thermodynamics, Thermochemistry, Equilibria, Physical-Chemical Analysis, Phase Transitions. B-8

Abs Jour: Referat. Zhurnal Khimiya, No 3, 1957, 7179.

Author : P.K. Migal', D.P. Belotskiy.
Inst : Kishinev University.
Title : Viscosity and Surface Tension in System Ethyl Alcohol - Aniline - Chloroform.

Orig Pub: Uch. zap. Kishinevsk. un-ta, 1957, 27, 119-125.

Abstract: The viscosity and surface tension (δ) were measured at 0° to 25° in the ternary system C_2H_5OH (I) - $C_5H_5NH_2$ (II) - $CHCl_3$ (III), in which III is an indifferent component. The results were treated by the method of divergences from additivity (N.A. Izmaylov, Zh. fiz. khimii, 1951, 25, 1070). It seems that a compound of I and II of the composition 1 : 1 is produced in the system at the expense of a hydrogen bond. The maximum divergence of δ from the additivity coincides with the composi-

Card : 1/2 -52-

5(2)

SOV/78-4-10-36/40

AUTHORS: Belotskiy, D. P., Noval'kovskiy, N. P.

TITLE: Electric Conductivity in Aqueous Sulfate Systems

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 10, pp 2403 - 2404 (USSR)

ABSTRACT: The electric conductivity of the systems $MnSO_4$ - H_2SO_4 - H_2O and $MgSO_4$ - H_2SO_4 - H_2O at a total concentration of sulfate and acid of 0.2 mole/l and at 20, 40, and 60° was investigated. The electric conductivity of both of these systems is graphed in figures 1 and 2, its deviation from the additivity in figures 3 and 4. The experimentally obtained conductivity lies below that theoretically calculated. The maxima of the deviations from the additivity correspond with an equimolar ratio between salt and acid and increase with increasing temperature. These results confirm the conception of Ya. A. Fialkov and Z. A. Sheka (Ref 5) that in these systems the number of charged particles is changed by complex formation. I. I. Moiseyev and R. M. Frid (Ref 6) state that in polybasic acids the reaction

Card 1/2

equilibrium can be shifted by the formation of acid salts. There are 4 figures and 6 Soviet references.

ASSOCIATION: Chernovitskiy gosudarstvennyy universitet (Chernovtsy State University)

SUBMITTED: July 1o, 1958

BELOTSKIY, D.P.; GUTSULYAK, B.M.

Consuctivity study of the reaction of potassiym ferricyanide with N-phenyllepidinium perchlorate in aqueous solution. Ukr. khim. zhur. 26 no.2:158-160 '60. (MIRA 13:9)

1. Chernovitskiy gosudarstvennyy universitet.
(Lepidinium compounds) (Potassium ferricyanide)

BELOTSKIY, D.P.; KHOKHOL, M.F.

Physicochemical analysis of aqueous solutions of the system phosphoric acid - sulfuric acid. Zhur. neorg. khim. 5 no.3:708-712 Mr '60. (MIRA 14:6)

1. Chernovitskiy gosudarstvennyy universitet.
(Phosphoric acid)
(Sulfuric acid)

ACCESSION NR: AR4020695 S/0275/64/000/001/B006/B006

SOURCE: RZh. Elektronika i yeye primeneniye, Abs. 1B32

AUTHORS: Belotskiy, D. P.; Koval'kovskiy, N. P.; Panchuk, I. E.

TITLE: Semiconductor alloys in the Zn-Cd-Sb system

CITED SOURCE: Nauchn. yezhegodnik za 1959 g. Cherny*shevskiy un-t. Khim. fak. Chernovtsy*, 1960, 627-629

TOPIC TAGS: semiconductors, semiconductor alloys, zinc cadmium antimony semiconductor, electric conductivity, thermal emf, impurity effect, equilibrium conditions, nonequilibrium conditions

TRANSLATION: The Zn-Cd-Sb diagram of state was investigated under equilibrium and non-equilibrium conditions, as was the electric conductivity and thermal emf of the pseudo-binary section Zn_3Sb_2--Cd_3Sb_2. Under non-equilibrium conditions a eutectic composition was observed.

Card 1/2

ACCESSION NR: AR4020695

similar to that of the central part of the diagram and degenerating after longer annealing (on the order of six days). At a composition ratio close to 1:1, the conductivity of the equilibrium alloys reaches a maximum while the thermal emf reaches a minimum, this being a characteristic attribute of semiconductor solid solutions. A study of the effect of impurities on the variation of the properties of the ternary alloy $CdZnSb_2$ has shown that the elements of the fourth period of the periodic table (Cu, Se) increases the conductivity to a maximum degree when the impurity content is 1--2%, whereas elements of the fifth period (Ag, Te) sharply increase the conductivity even at a concentration on the order of 0.1%. The influence of the impurity is determined by the electron shell structure of the introduced impurity. Bibliography, 7 titles. N. Sh.

DATE ACQ: 03Mar64 SUB CODE: PH, GE ENCL: 00

Card 2/2

S/058/62/000/002/021/[illegible]
A061/A101

24,7700 (1043,1055,1385)

AUTHOR: Belotskiy, D. P.

TITLE: Some rules governing semiconductor compounds with sphalerite and sodium chloride structure

PERIODICAL: Referativnyy zhurnal, Fizika, no. 2, 1962, 16, abstract 2E161 (V sb. "Vopr. metallurgii i fiz. poluprovodnikov". Moscow, AN SSSR, 1961, 18 - 23)

TEXT: The forbidden band width has been found to be linearly dependent on the melting temperature (or on the total atomic number) of compounds with sphalerite structure and with a common element of group V (or VI). The logarithm of mobility is also expressed as a linear function of the total atomic number. The melting temperature is expressed as a linear function of the total atomic number of group I compounds having a common halide. The same relationship exists between mobility and the total atomic number of these compounds. The presence of a linear dependence for the mentioned compounds with a sphalerite and sodium chloride structure offers the possibility of obtaining semiconductor materials with pre-assigned properties.
[Abstracter's note: Complete translation]

Card 1/1

30948
S/576/61/000/000/002/020
E021/E120

94,7700 (1043,1055,1136)

AUTHOR: Belotskiy, D.P.

TITLE: On certain relationships of semiconducting compounds with zinc blende and sodium chloride structures

SOURCE: Soveshchaniye po poluprovodnikovym materialam, 4th. Voprosy metallurgii i fiziki poluprovodnikov; poluprovodnikovyye soyedineniya i tverdyye splavy. Trudy soveshchaniya. Moscow, Izd.-vo AN SSSR, 1961. Akademiya nauk SSSR. Institut metallurgii imeni A.A. Baykova. Fiziko-tekhnicheskiy institut. 18-23

TEXT: It is shown that for a series of compounds with zinc blende structure (AlP, GaP, InP; AlAs, GaAs, InAs; AlSb, GaSb, InSb; ZnTe, CdTe, HgTe) containing elements of the 5th or 6th group, there is a linear relationship between the width of the forbidden energy band and the melting point. There is also a linear relationship between the total atomic number of the compounds and melting point, and between log. electron mobility and total atomic number. Compounds with a sodium chloride structure were also examined. The relationships between the total

Card 1/4

On certain relationships of ....

atomic number, the melting point and the electron mobility are shown in Fig.4. The relation between total atomic number and melting point of bromides is characterised by two almost parallel straight lines. The lower series consists of LiBr, CuBr, AgBr and TlBr, and the higher series NaBr, KBr, RbBr, CsBr. The relationship for chlorides with the same elements gives similar lines with the exclusion of TlCl. In the case of iodides, NaI transferred to the lower line and LiI is situated beneath both lines. The situation is more complex for fluorides and there are three straight lines. The highest one includes NaF, CuF; the middle one KF, RbF, CsF; and the lowest one LiF, AgF. Similar straight line relationships are found between the electronic mobility and the total atomic number for these compounds. The existence of these linear relationships makes it possible to predict the properties of semiconducting materials in a series of compounds, if the properties of some of the compounds in the series are already known.

There are 4 figures and 12 references: 6 Soviet bloc, 1 Russian translation from non-Soviet-bloc publication and 5 non-Soviet-bloc.

Card 2/4

BELOTSKIY, D.P.

Investigating the interaction between aqueous solutions of phosphoric acid and glycerol by methods of physicochemical analysis. Izv.vys.ucheb.zav.; khim.i khim.tekh. 4 no.1:158-160 '61. (MIRA 14:6)

1. Chernovitskiy gosudarstvennyy universitet, kafedra neorganicheskoy khimii.
(Phosphoric acid) (Glycerol)

BELOTSKIY, D.P.; NOVAL'KOVSKIY, N.P.; MIDONOVA, N.N.

Study of the interaction of sulfuric acid and glycerol in aqueous solution by methods of physicochemical analysis. Izv.vys.ucheb. zav.; khim.i khim.tekh. 4 no.6:1035-1037 '61. (MIRA 15:3)

1. Chernovitskiy gosudarstvennyy universitet, kafedra neorganicheskoy khimii.
(Sulfuric acid) (Glycerol)